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JOURNAL

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SOUTH AFRICAN BOTANY

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EUPHORBIA SPECIES FROM THE FLORA ZAMBESIACA AREA

L. C. Leach

(With Plates I–V.)

Euphorbia malevola Leach, sp. nov.

Euphorbia ? *tortistyla* N.E. Br. sensu White, Dyer and Sloane, The Succulent Euphorbieae, 2: 739, quoad specim. Christian et figs. 829 and 830 (1941).

E. complexae R. A. Dyer affinis sed altiore habitu, caulibus paucioribus, spinis longioribus et spinulis minoribus, stylis multo longioribus, contortis differt.

Frutex succulentus, spinosus, e basi et superne parce ramosus, usque ad 1·5 m. altus (plerumque c. 1 m., perrariter ad 3 m.). *Rami* patuli, ascendentes, 4 (rariter 5) angulati, plerumque c. 1 cm. crassi, faciebus lateralibus leviter concavis vel planis, angulis sinuato-tuberculatis. *Podaria* truncata vel interdum emarginata, decurrentia paene ad cicatricem cymae, sed haud confluentia, atro-purpurea vel fusco-brunnea. *Spinae* aciculares binae, apice tuberculorum dispositae, divergentes, 5—7 mm. longae; spinulae binae, 1·5—2 mm. longae, c. 2 mm. supra spinas. *Foliorum* rudimenta late ovata, acuta, c. 1·5 mm. longa, cicatribus inconspicuis. *Inflorescentia* cymosa, perbreviter pedunculata; cyathia 3, horizontaliter disposita, supra podarium producta; cyathium medium masculinum, deciduum; cyathia lateralia bisexualia, ramis cymarum c. 2 mm. longis. *Involucrum* infundibuliforme, 5—5·5 mm. diam., 3 mm. longum, lobis 5, subquadratis, fimbriatis; glandulis 5, transverse oblongis, 2·25.—3 mm latis, suberectis vel patulis, contiguis, brunneo-flavis, marginibus purpureis vel sanguineis, plerumque paulo crispis. *Flores masculini* 10, 5-fasciculati;

bracteolae filiformes integrae vel fimbriatae; bracteae fasciculares laciniatae, fimbriatae. *Ovarium* trigonum, subsessile, in cyathio inclusum; styli libre fere e basi, patuli reflexique, contorti, 3·25—4 mm. longi, apicibus capitatis, rugulosis, integris vel emarginatis. *Capsula* globoso-trigona, 3·5—4 mm. diam., 3—3·5 mm. alta, subsessilis. *Semen* subglobosum, c. 1·5 mm. diam., verrucosum, brunneum, verruculis pallidis.

Type: *L. C. Leach* 5083 (K; LISC; PRE; SRGH holotype). Plate I.

E. malevola seems to be most closely related to *E. complexa* R. A. Dyer but is a very different plant in many ways, perhaps most noticeably, in herbarium material, in the exceptional length of the styles which almost invariably become spirally twisted. The spinescence is also different, the main spines being longer and the subsidiary spines proportionately shorter than those of *E. complexa* (in this character *E. malevola* has a less close connection with *E. isacantha* Pax than has *E. complexa*); the spine shields are more decurrent, sometimes reaching the flowering eye below.

The habit of the two species is entirely different, *E. malevola* being a much taller shrub with fewer branches from the base, its usual height is about 1 m. (Dr. I. B. Pole-Evans records a plant about 3 m. high but this is exceptional) while *E. complexa* is essentially a low (usually less than 40 cm.) densely branched plant forming large clumps, frequently with new plants a short distance from the parent, arising from branches spreading stolon-like below ground. The branches of *E. malevola*, variable in colour, have the angles closely mottled with darker colour, imparting a distinctive longitudinally striped appearance to the younger parts of the plant; the branches of *E. complexa* are a uniform green. Plate II, Fig. 1.

Plant: a spiny succulent shrub, branching from the base, sparingly branched above, up to 1·5 m. high (usually c. 1 m., exceptionally up to 3 m.). *Branches* spreading, ascending or ascending-erect (sometimes trailing on rocks), 4 (rarely 5) angled (5 angled branches are always longitudinally twisted), c. 1 cm. thick (up to 2 cm.), with the sides concave or flat, the angles sinuate-tuberculate, (old parts becoming sub-cylindric). *Spine shields* truncate, sometimes emarginate, decurrent nearly to the flowering eye below, sometimes touching it but not forming a continuous margin, dark purple or purple-brown, becoming grey with age. *Spines* needle-like, in pairs, produced at the apex of the tubercles, diverging, more or less horizontally spreading, 5—7 mm. long; subsidiary spines in pairs about 2 mm. above the main spines, 1·5—2 mm. long, one each side of the inconspicuous reinform or transversely elliptic leaf scar. *Leaves* rudimentary, broadly ovate, acute, c. 1·5 mm. long. *Inflorescence* a very shortly pedunculate cyme of 3 cyathia, produced in a plane at right-angles to the axis of the branch, from the flowering eye immediately or a little above the spine shield; bracts depressed ovate, irregularly denticulate; the central cyathium male, deciduous; the bisexual lateral cyathia raised on cyme branches c. 2 mm. long. *Involucre* funnel shaped 5—5·5 mm. diam., 3 mm. long with 5 glands and 5 subquadrate fimbriate lobes; glands transversely oblong with a small raised lip on the inner margin, 2·25—3 mm. in their greater diam., sub-erect to spreading, contiguous, rugulose, brownish yellow with the outer margin dark purple or purplish red, frequently slightly crisped; bracts subquadrate, obtuse, irregularly denticulate, emarginate or mucronate. *Staminate flowers:* 10, each with a filiform or filiform fimbriate bracteole, arranged in 5 separate bracteate fascicles, each fascicle enveloped in a broad laciniate fimbriate bract which is attached at the sides to the wall of the involucre to about mid-way from the base, forming a pocket in which the stamens and bracteoles are inserted. *Pistillate flower:* ovary trigonous, subsessile, included in the involucre; styles 3·25—4 mm. long, free nearly to the base, spreading recurved, contorted, with entire or sometimes emarginate, capitate, rugulose apices. *Capsule* globose-trigonous, 3·5—4 mm. diam., 3—3·5 mm. high, dull green heavily marked with purple, subsessile; calyx rim-like, obtusely triangular. *Seed* verrucose, sub-globose, c. 1·5 mm. diam., yellow brown or olive brown, warts paler coloured, sometimes whitish.

In the wide distribution of the species there are naturally some deviations from the type and two subspecies can be recognised.

Subsp. **malevola:** the inflorescence of this subsp. consists of a very shortly pedunculate cyme of three cyathia which are horizontally arranged, with the bisexual lateral cyathia raised on short cyme branches; the involucre is funnel shaped with brownish yellow glands with a purple or red outer margin.

S. Rhodesia. Wankie Distr.: Victoria Falls, Sept. 19, 1940, *H. B. Christian* 381 (PRE); 5 miles S. of Inyantui Riv. Bridge, S. of Wankie, cult. at Greendale, S. Rhodesia, fl. Nov. 1962, *L. C. Leach* 5216 (SRGH). Binga Distr.: on hills in the vicinity of the Zambesi Riv. (now submerged under the waters of Lake Kariba) in Commiphora sp. association, fl. Sept. 10, 1949, *O. West* 2921 (PRE). Urungwe Distr.: Charawa Riv., c. 1500′ alt., fr. Aug. 31, 1956, *L. Mullin* 53/56 (SRGH). Mtoko Distr.: 9 miles W. of Mtoko on granite slab rocks, c. 3500′ alt., fl. July 23, 1959, *L. C. Leach* 9239 (COI; PRE; SRGH); 14 miles E. of Mtoko on granite outcrop, cult. at Greendale, S. Rhodesia, fl. Sept. 12, 1962, *L. C. Leach* 9939 (G; LM). Goromonzi Distr.: near "Mermaid's Pool", on granite whaleback, fl. Sept. 18, 1951, *H. Wild* 3663 (SRGH); ibid., fl. July 18, 1959, *L. C. Leach* 9220 (G; K; LISC; PRE; SRGH). Chibi Distr.: "Hippo Pools", Lundi Riv., near Rhino Hotel, c. 2000′ alt., fl. Nov. 1956, *L. C. Leach* 5116 (CAH; K; PRE; SRGH). Victoria Distr.: between Ngundu Halt and Triangle, c. 29 miles E. of Ngundu Halt, July 5, 1962, *I. B. Pole-Evans* 6379 (PRE); ibid., Jan. 15, 1963, *L. C. Leach* 11597 (CAH; COI; G: LISC; LM; PRE); 20 miles E. of Ngundu Halt, on granite slopes, Jan. 15, 1963,

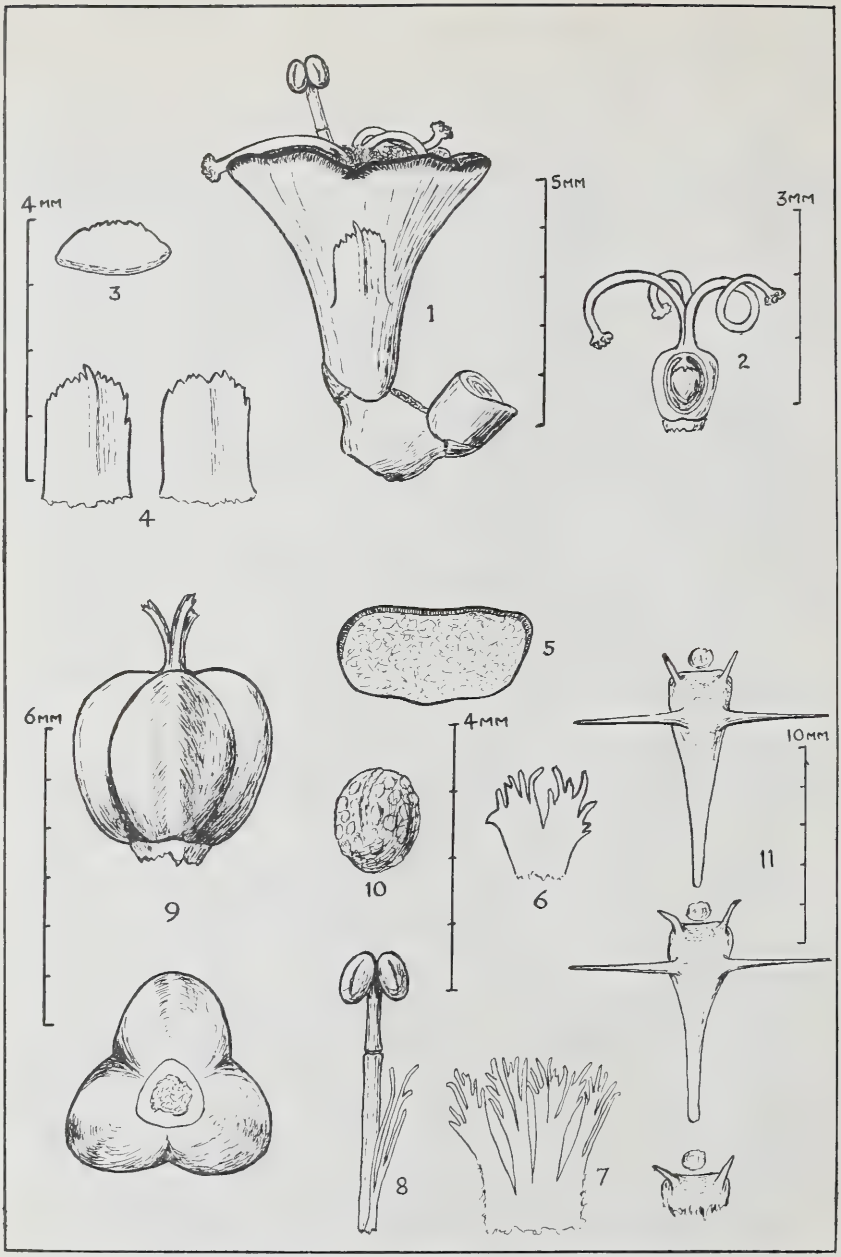

FIG. 1. *E. malevola* Leach.

1. Bisexual cyathium.
2. Pistillate flower.
3. Peduncular bract.
4. Involucral bract.
5. Involucral gland.
6. Involucral lobe.
7. Internal fascicular bract.
8. Male flower and bracteole.
9. Capsule.
10. Seed.
11. Spines and spine-shields.

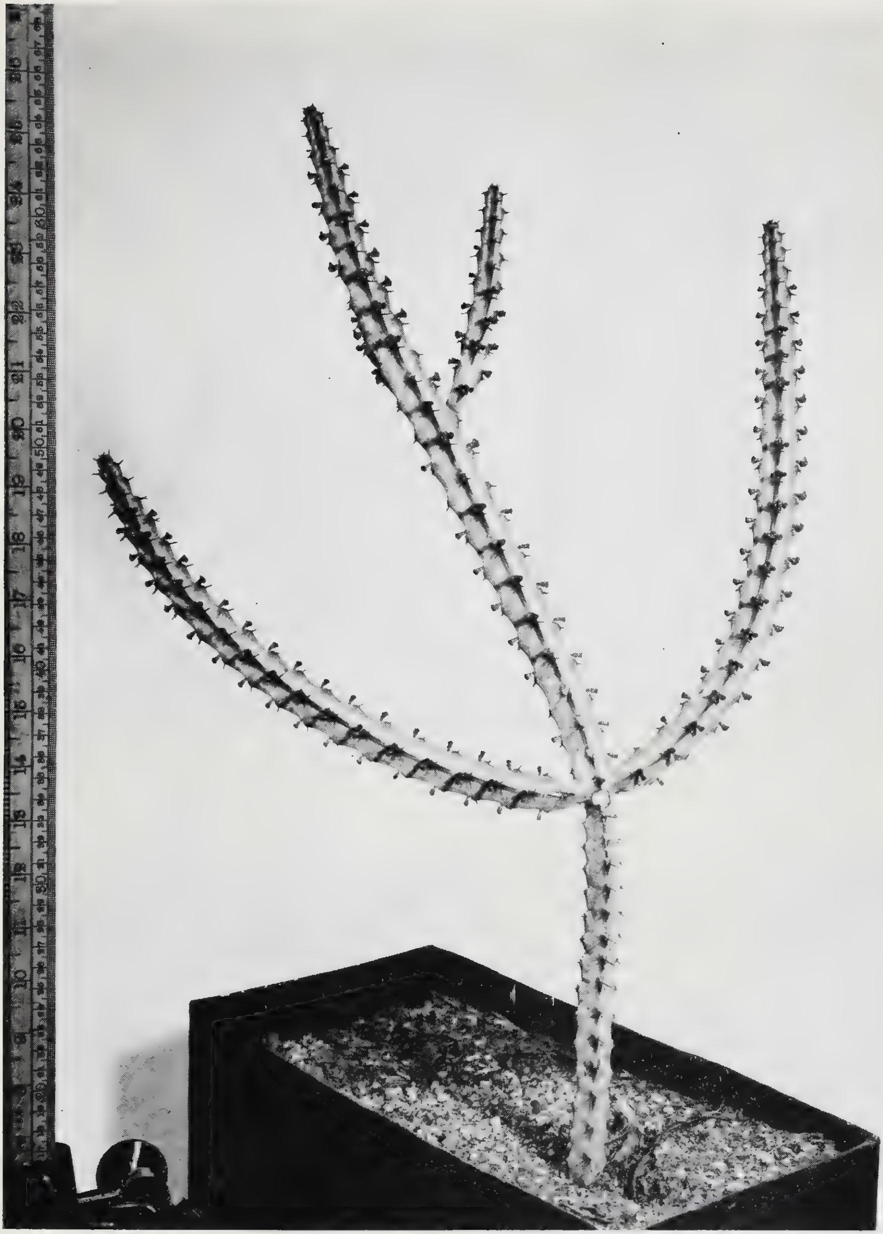

PLATE I. *Euphorbia malevola* Leach.

A cutting from the Type plant, cultivated at the Division of Botany, Pretoria.

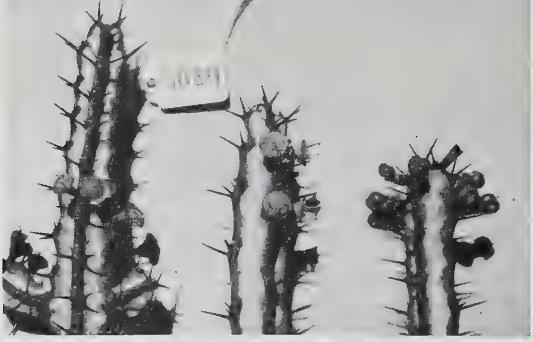

FIG. 1. Apical portions of branches shewing characteristic longitudinally striped appearance.

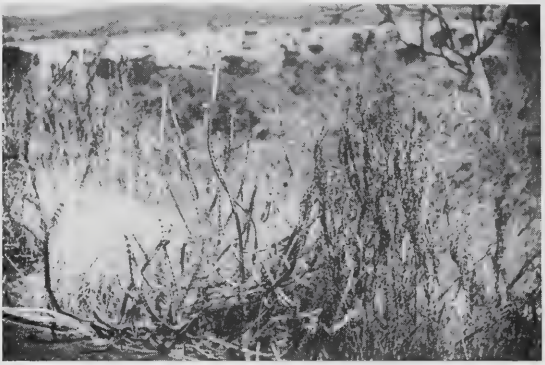

FIG. 2. Plants near Salisbury with weak trailing habit.

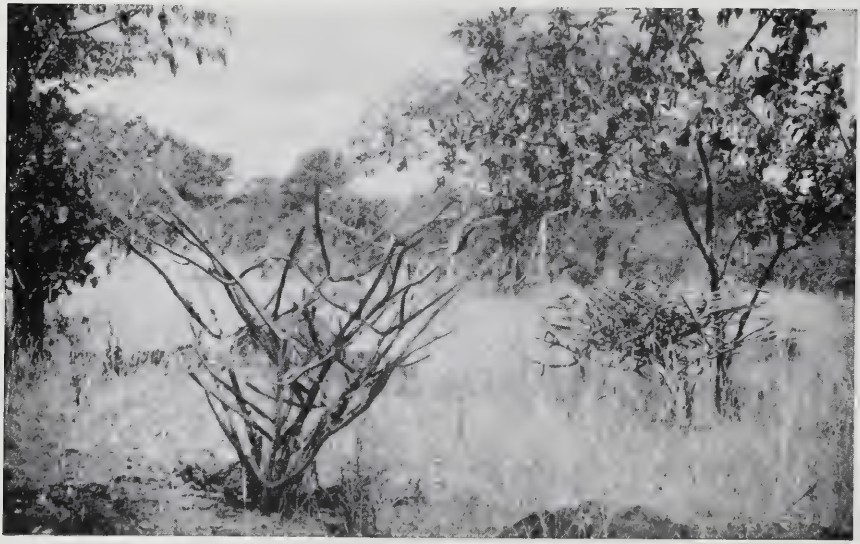

FIG. 3. Plants in the Wankie District shewing more rigid habit.

PLATE II. *Euphorbia malevola* Leach.

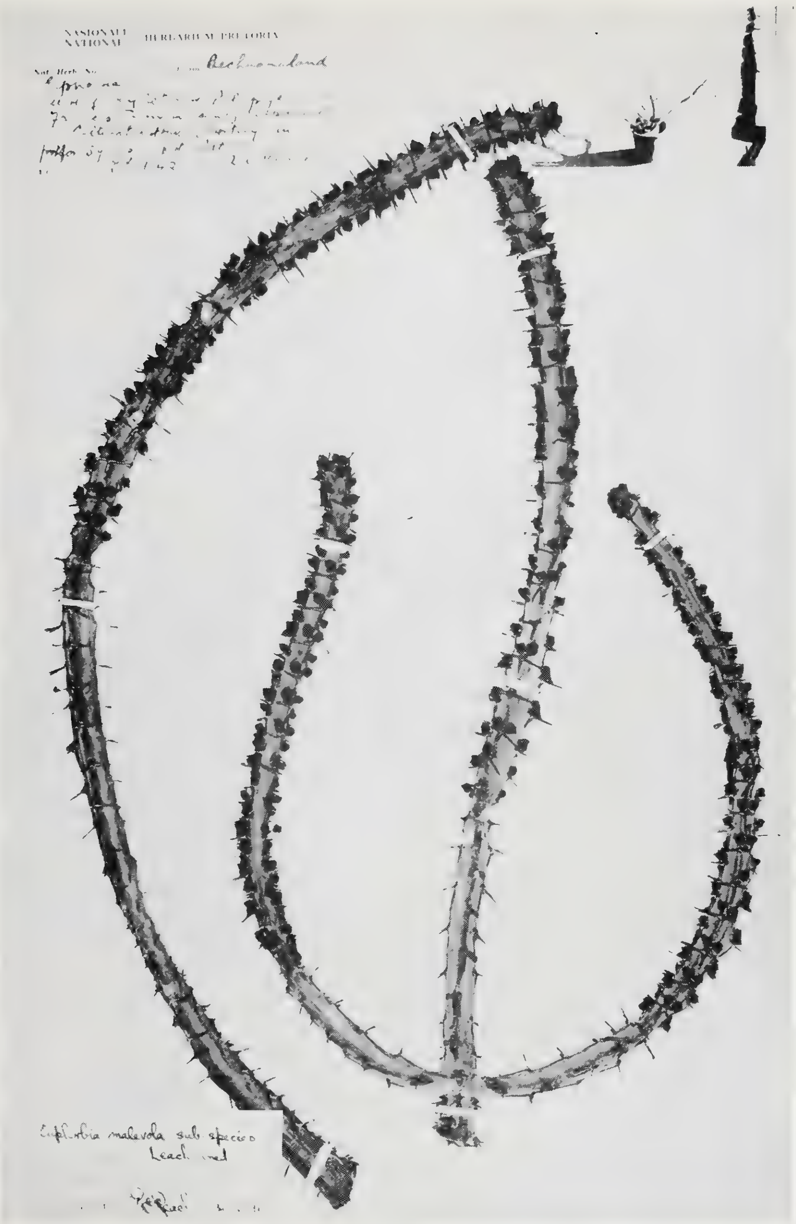

PLATE III. *Euphorbia malevola* subspecies *bechuanica* Leach.

The Type specimen, *A. A. Obermeyer* s.n., from a plant cultivated at the Division of Botany, Pretoria.

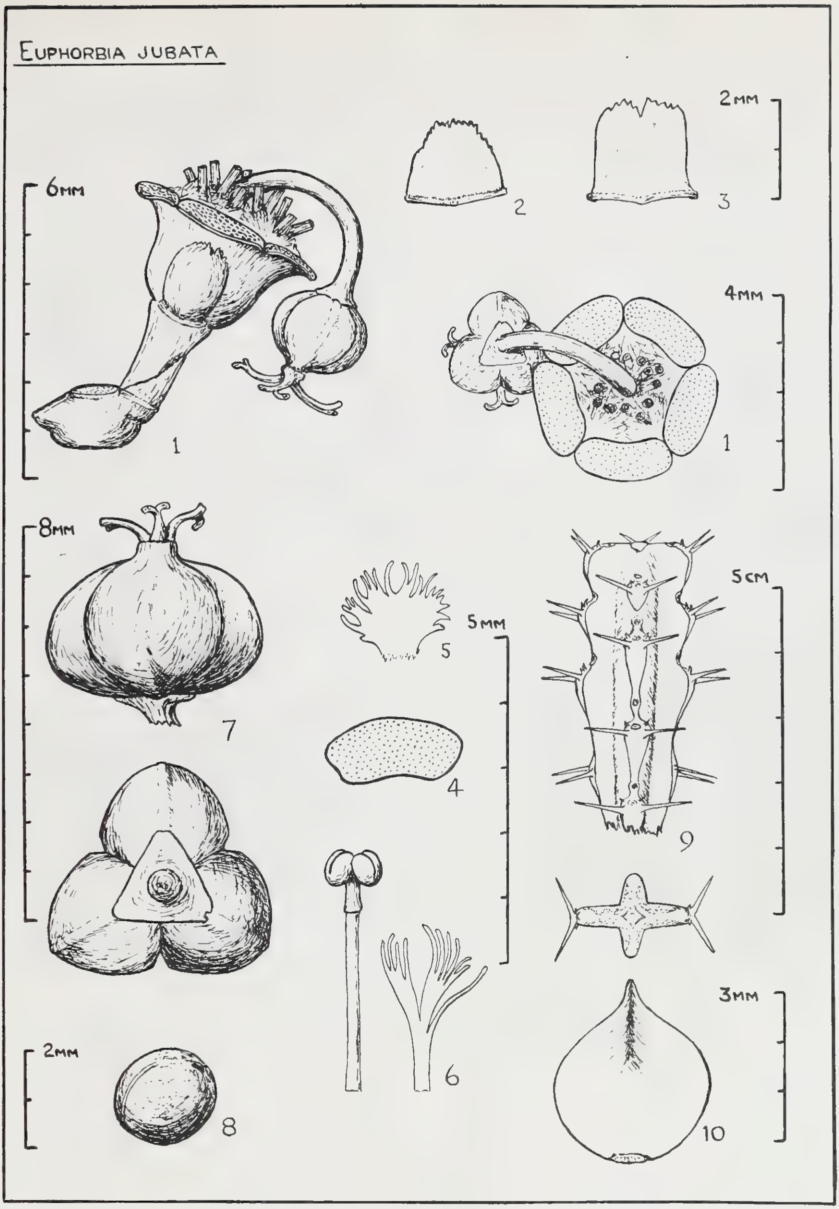

FIG. 1.

(1) Bisexual cyathium.
(2) Peduncular bract.
(3) Involucral bract.
(4) Involucral gland.
(5) Involucral lobe.
(6) Staminate flower with bracteole.
(7) Capsule.
(8) Seed.
(9) Portion of branch with section.
(10) Leaf.

L. C. Leach 11599 (K; SRGH). Nuanetsi Distr.: 6 miles S. of Lundi Riv. on Salisbury/Beitbridge road, on granite slopes, c. 2000′ alt., approx. 20° 58′ S., 30° 45′ E., cult. at Greendale, S. Rhodesia, fl. and fr. Aug. 27, 1962, *L. C. Leach* 5083 (K; LISC; PRE; SRGH). Ndanga Distr., Sabi/Lundi Junct., *H. Hall* s.n., cult. Nyamandhlovu, fl. June 1955, *D. C. Plowes* 1862 (SRGH). Chipinga Distr.: Selanduna Falls on the Sabi Riv. near Sabi/Lundi Junct., fl. Sept. 23, 1952, *R. C. Stock* s.n. (PRE).

N. RHODESIA. Mazabuka Distr: between Livingstone and Kalomo, July 10, 1930, *I. B. Pole-Evans* 2793 (50) (PRE: SRGH).

NYASALAND. Central Prov.: Dedza, N. of Angoni Highlands Hotel, dwarf *Brachystegia-Uapaca-Monotes* woodland, in rock clefts, alt. c. 5000′, fl. Sept. 30, 1954, *P. J. Greenway* 8814 (EA; PRE). Southern Prov.: 23 miles N. of Fort Johnston, among rocks in tree shade, c. 1500′ alt., cult. at Greendale, S. Rhodesia, fl. Nov. 10, 1959, *L. C. Leach* 9513 (SRGH).

A specimen from Zumbo, Tete Distr. of Moçambique: *Pedro and Pedrógão* 8311 (PRE), seems to belong here but the identification is unfortunately, not quite certain, owing to the advanced stage of the inflorescence.

It was at first thought that the distribution of the species extended into S. Tanganyika, but although they are certainly related it is now considered that plants from near Chimala (E. of Mbeya) are distinct.

Plants from the more northerly areas of the distribution frequently have only 5 male flowers, the bracteoles are often absent and the fascicular bracts are sometimes divided to the base; specimens from the higher altitudes tend to have a weaker more trailing habit than those from lower altitude localities, see Plate II Figs. 2 and 3, while the lowveld plants very occasionally have some of the spine shields united to form a partly continuous margin.

Subsp. **bechuanica** Leach, subsp. nov., a subspeciei typica cymis et cyathiis lateralibus sessilibus et saepe cyathiis 2 additis, verticaliter dispositis, involucro crateriformi et glandulis flavis sine marginibus sanguineis differt.

Type: *A. A. Obermeyer*, 1942, s.n. (K; PRE, holotype). Plate III

The subsp. *bechuanica* differs from the type in its sessile inflorescence, shallow involucre with unmargined glands and in its tendency to produce additional bisexual cyathia above and below the central male cyathium. The styles are perhaps even slightly longer and are rolled into an even tighter spiral than those of the type.

BECHUANALAND PROTECTORATE. "Halfway between Palapye and Francistown in sandy mopane veld" Cult. Division of Botany, Pretoria, fl. July 1937, *A. A. Obermeyer* s.n. (PRE); fl. 1942, *A. A. Obermeyer* s.n. (K; PRE).

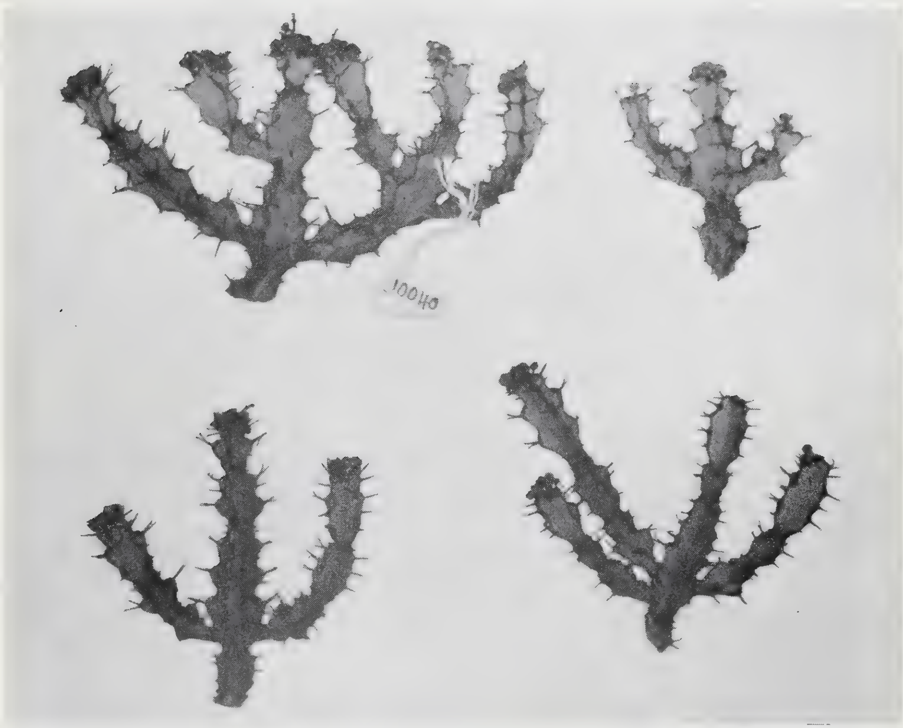

Plate IV. *Euphorbia jubata* Leach.

Branches of a plant from near Serenje, Central Province, Northern Rhodesia, shewing the inflorescences crowded together at the apices.

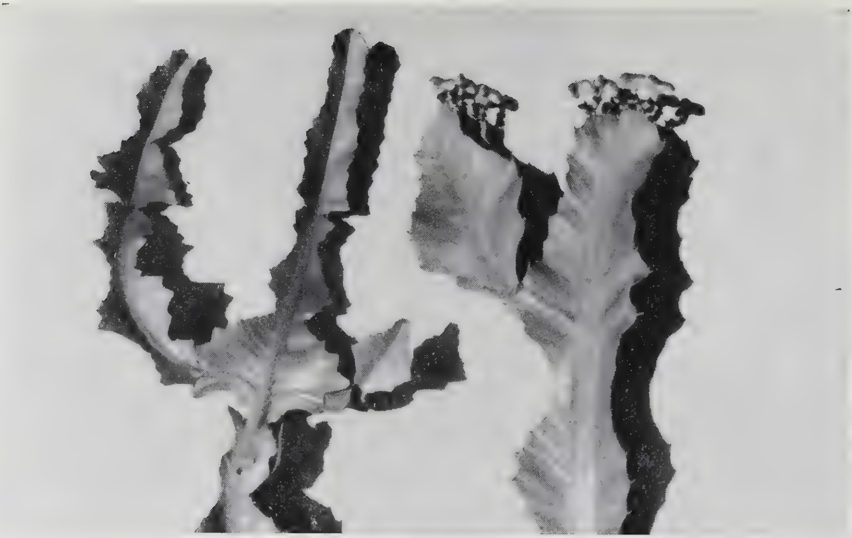

FIG. 1. Branch segments from a plant collected between Mambone and Divinhé, near the mouth of the Save River.

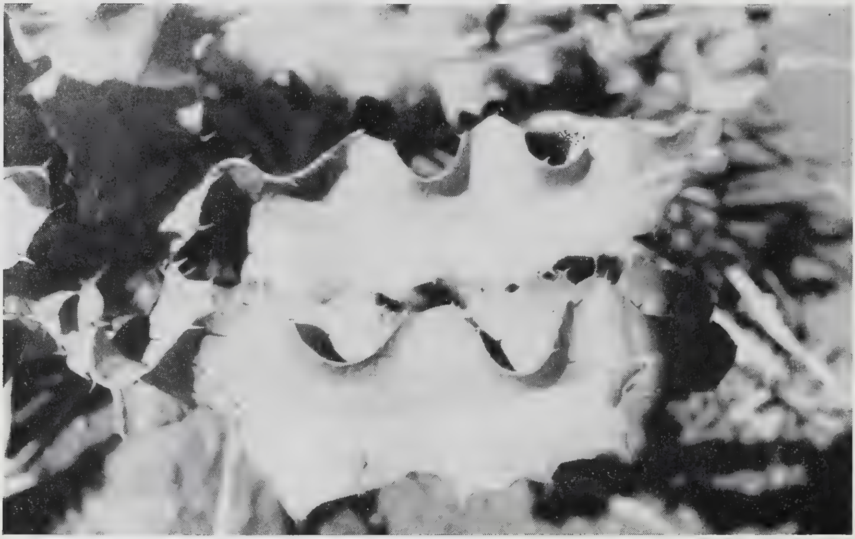

FIG. 2. Cultivated plant from Macuti Beach, Beira, shewing wavy wing margins.

PLATE V. *E. bougheyi* Leach.

Euphorbia jubata Leach, sp. nov.

Euphorbiae schinzii Pax affinis sed ovario pedicello longo curvato, ex involucro exserto, ramis ramulosis, plerumque in segmenta constrictis, saepe marginibus corneis partim continuis et cymis breviter pedunculatis differt.

Frutex succulentus spinosus pumilus ramosissimus, c. 15 cm. altus. *Rami* 4-angulati (perrariter 5), profunde sulcati, plerumque in segmenta irregulariter constricti; dentes tuberculorum obtusi, saepe truncati, ad 2·5 mm. alti, 7—12 mm. distantes. *Podaria* supra producta cicatricem cymae includentia, decurrentia, saepe confluentia, pallide brunnea deinde grisea. *Spinae* binae, 4—7 mm. longae, plus minusve horizontaliter patentes, divaricatae, apice tuberculorum dispositae; cicatrices foliorum subcirculares nonnunquam spinulis binis plerumque uncinatis praeditae. *Folia* sessilia, glabra, carnosa, subcircularia vel late ovata, apiculata, leviter carinata, usque ad 3·75 mm. longa, 3·5 mm. lata, mox decidua. *Inflorescentia* cymosa, perbreviter pedunculata; pedunculus crassus, brevis, bibracteatus; bracteae late ovatae, obtusae vel truncatae, irregulariter denticulatae, c. 1·5 mm. longae; cyathia 3, horizontaliter disposita; cyathium medium nonnunquam masculinum deciduum, saepe bisexuale; cyathia lateralia semper bisexualia, ramis cymarum 1·5—2·5 mm. longis, bracteis subquadratis, c. 2 mm. longis, obtusis, emarginatis, irregulariter denticulatis. *Involucrum* glabrum, cupuliforme, 3·5—4 mm. diam., lobis 5, transverse late ellipticis fimbriatis; glandulae 5, flavae, planae vel convexae minute foveolatae, transverse oblongo-ellipticae vel aliquantum reniformes, patulae valde contiguae. *Flores masculini* numerosi, bracteolis fimbriis filiformibus. *Ovarium* trilobatum, pedicello longo curvato ex involucro exsertum, calyce carnoso, obtuse deltato; styli breves, crassi, patuli libri fere ad basem, apicibus rugulosis, breviter bifidis. *Capsula* obtuse trilobata, 4·5 mm. diam., c. 3 mm. alta, angulis leviter obtuse carinatis vel subacutis, inter lobos acute sulcata; pedicellus c. 5 mm. longus, leviter sulcatus. *Semen* subglobosum 1·75—2 mm. longum, flavobrunneum, laeve. Plate I

Type: L. C. Leach and T. Brunton 10040 (G; K; PRE; SRGH holotype).

N. Rhodesia. Central Province: Serenje Distr., 2 miles W. of Serenje, approx. 30° 15′ E., 13° 16′ S., c. 4850′ alt., among granite rocks on small kopje, *Brachystegia-Uapaca* woodland, fl. and fr. June 14, 1960, Leach and Brunton 10040 (G; K; PRE; SRGH).

Plant a spiny, succulent, dwarf shrub, c. 15 cm. high, densely branched and rebranched, somewhat pulvinate. *Branches* 4-angled (very rarely 5), c. 1·25 cm. thick excluding the tubercles, sharply longitudinally furrowed between the angles, usually slightly constricted into segments of varying length; tubercle teeth obtuse, frequently truncate on the upper slope, particularly at and towards the apex of the branches, up to 2·5 mm. high, 7—12 mm. apart along the angles. *Spine shields* extended above, along the upper slope of the tubercle

teeth, including the flowering eye, decurrent below, sometimes confluent and forming a partly continuous horny margin, pale brown becoming grey with age. *Spines* 4—7 mm. long, in pairs at the apex of the tubercles, more or less horizontally spreading, widely diverging, frequently with a pair of prickles, usually hooked, one on each side of the rather small subcircular leaf scar. *Leaves* sessile, fleshy, subcircular or broadly ovate, apiculate, lightly keeled, up to 3·75 mm. long, 3·5 mm. broad, soon deciduous. *Inflorescence* a very shortly pedunculate cyme of 3 cyathia arranged in a plane at right-angles to the axis of the branch, produced usually only at the truncate apex of the branches; peduncle ·75—1·5 mm. long, 2·5 mm. diam.; bracts broadly ovate, obtuse or truncate, irregularly denticulate, c. 1·5 mm. long; central cyathium male deciduous or frequently bisexual, lateral bisexual cyathia raised on stout cyme branches 1·5—2·5 mm. long; bracts subquadrate, obtuse, emarginate irregularly denticulate, c. 2 mm. long. *Involucre* glabrous, cupuliform, 3·5—4 mm. diam., 2—2·25 mm. long, with 5 transversely broadly elliptic fimbriate lobes, c. 1·5 mm. long and 5 transversely oblong-elliptic or somewhat reniform, closely contiguous, spreading glands, 1·75—2·2 mm. in their greater diam. with their outer and end margins slightly thickened beneath, the upper surface greenish yellow, convex or flat, minutely pitted (rugulose when dried). *Staminate flowers* numerous; pedicels c. 3 mm. long, filaments c. ·75 mm. long; bracteoles fimbriate with long filiform fimbria. *Pistillate flower* exserted from the involucre on a long, curved pedicel; calyx fleshy, obtusely triangular; ovary 3-lobed; ovule attached under a minutely toothed, two lobed shallow hood. Styles stout, ·75—1·2 mm. long, free nearly to the thickened base, spreading, with shortly bifid rugulose apices. *Capsule* 3-lobed, c. 4·5 mm. diam., c. 3 mm. high, obtusely lightly keeled or subacute on the angles, sharply furrowed between the lobes, borne on a lightly sulcate pedicel c. 5 mm. long with a triangular calyx. *Seed* subglobose 1·75—2 mm. long, yellow brown, sometimes faintly mottled or reticulately marked with darker colour, smooth, suture very slightly raised with a dark brown line on each side.

E. jubata is known only from the type locality where plants are numerous on and among granite rocks in tree shade. It is apparently confined to one small hill where the local abundance of mosses, lichens and epiphytic orchids would seem to indicate a very moist climate. The inflorescence is usually produced only from the ultimate flowering eyes; the cyathia crowded together on the flat apices of the branches then imparting a very crested appearance to the plants.

The closest relationship of the new species appears to be with *E. schinzii* Pax, there are also close ties with *E. tetracanthoides* Pax; both these species have the capsule barely or only partly exserted from the involucre while that of *E. jubata* is much exserted on a long, curved pedicel.

Additional cyathia, when produced, are formed in the axils of the bracts on each side of the lateral cyathia. The development of tertiary cyathia does not appear to be dependent on the abortion of the ovary of the secondary cyathium as is the case with other related species such as *E. knuthii* Pax.

Euphorbia bougheyi Leach, sp. nov.

E. dawei N.E. Br. affinis sed inflorescentia unicymosa, involucro multo majore, glandulis contiguis, valde concavis marginibus erectis, ovario in involucro incluso et capsula multo majore profunde trilobata differt.

Arbor xerophytica, spinosa, 4 m. (7) alta, trunco cylindrico, nudo, tenui, ramis verticillatis, alatis, patulis, arcuatis, ascendentibus, versus apicem instructo. *Rami* 2—5 alati, plerumque 3, in segmenta varia, plerumque oblonga, constricti, parte media tereti, mox lignea; alae 2·5—5 cm. latae, tenuissimae, marginibus prominenter vel obscure crenatis, valde crispis; ramuli saepe 2-alati, versus apices ramorum ex marginibus alarum vel interdum ex constrictionibus producti; apices ramorum et ramulorum obtusi vel emarginati. *Podaria* parvula, plus minusve anguste elliptica, apicibus crenaturarum disposita, saepe disjuncta, interdum confluentia, spinis binis ad 7·5 mm. longis armata. *Foliorum* rudimenta ovata, deltata, acuta, recurva, reliquiis plerumque persistentibus. *Inflorescentia* axillaris, cymosa; cyma una perbreviter pedunculata, 3—5 mm. supra spinas producta, cyathiis 3, verticaliter vel oblique vel horizontaliter dispositis; pedunculus crassus, bibracteatus; bracteae plus minusve latissime ovatae, versus basem subcarnosae, plerumque scissae ad basem; cyathium medium masculinum, persistens; cyathia lateralia bisexualia, ramis cymarum crassis, brevibus; bracteae plus minusve depresse ovatae, plerumque scissae fere ad basem. *Involucrum* glabrum latissime infundibuliforme, ad 10 mm. diam., 4·5 mm. longum, lobis 5, transverse late ellipticis, irregulariter dentatis, versus basem subcarnosis; glandulae 5, flavae, rugulosae, patulae, contiguae, irregulariter plus minusve transverse anguste elliptisae, 5—5·5 mm. latae, valde carnosae, profunde concavae, marginibus erectis, margine exteriore crispo. *Flores masculini* numerosi, 5-fasciculati, bracteolis laciniatis fimbriatis; bracteae fasciculares laciniatae fimbriatae, paulo carnosae. *Ovarium* trilobatum, obovoideum, subsessile, in cyathio inclusum; calyx crassus, carnosus, crateriformis, subtrilobatus, dentatus; styli c. 3 mm. longi, libre fere ad basem, patuli reflexique, apicibus rugulosis, breviter bifidis. *Capsula* profunde trilobata, truncata, 19—23 mm. diam., 8·5—9·5 mm. alta, gynophorio crasso, ad 7 mm. longo, tandem ex involucro exserta, calyce irregulariter deltato apicibus acutis vel dentatis. *Semen* subglobosum, c. 3·75 mm. diam., laeve.

Type: A. S. Boughey 12206 (CAH; COI; G; K; LISC; LM; PRE; SRGH holotype).

MOÇAMBIQUE. Manica e Sofala; Macuti Beach, near Beira, in bud June

17, 1959, *Leach* 9154 (PRE; SRGH); between Mambone and Divinhé, fr. Sept. 2, 1961, *Leach* 11254 (CAH; COI; G; K; LISC; LM; PRE; SRGH); Macuti Beach, fr. Aug. 1962, *A. R. A. Noel* s.n. (K; PRE; SRGH); ibid., fl. July 1, 1963, *R. P. Ellis* s.n. (BRLU; K; PRE; SRGH); plant collected at Macuti Beach, approx. 10° 50′ S., 34° 52′ E., 1958, cultivated in the University gardens, Salisbury, S. Rhodesia, fl. July 18, 1963, *A. S. Boughey* 12206 (CAH; COI; G; K; LISC; LM; PRE; SRGH).

E. bougheyi is related to *E. dawei* N.E. Br. from Uganda, but differs in having an inflorescence consisting of a single cyme and in its very much larger involucres with deeply concave contiguous glands which have both margins erect; the ovary of *E. bougheyi* is included and the very much larger capsules are deeply three lobed.

Plants occur on the swampy coastal plain of Moçambique in the Manica e Sofala District. The type locality is at Macuti Beach, just outside Beira, where the species is found growing in the evergreen coastal scrub within less than a half mile from the sea; further South the habitat of the species is in small patches of dense woodland in low lying grassland savanna near the mouth of the Save Riv. between Mambone and Divinhé. Plants are nowhere common and it seems probable that the distribution may be found to extend into the similar rather inaccessible country to both the North and South of the presently known limits.

Description

Plant: a xerophytic spiny tree, up to c. 7 m. high, with a nude, cylindric, relatively slender trunk, the apical portion of which is spiny and angular, with up to 9 angles, with a crown of verticillate, spreading, arcuate-ascending, winged branches; the rather small crown is 2—3 m. in diam. The *branches* have wide extremely thin wings and a central terete woody core and are constricted into segments of very variable shape and size, usually oblong (see Plate V, fig. 1), sometimes constricted only at the stalk-like base, 2—5 winged, (most frequently 3); the wings 2·5—5·0 cm. wide, with the margins prominently or obscurely crenate toothed, usually much crisped and wavy (see Plate V, fig. 2). The ultimate branchlets which are frequently 2-winged, are produced in clusters from the wing margins or occasionally from the constrictions towards the apex of the branches; the apices of the branches and branchlets obtuse or emarginate. *Spine shields* at the apex of the crenations, very small, more or less very narrowly elliptic, sometimes produced above enclosing the flowering eye in the axils of the crenations 3—5 mm. above the spine pairs, usually separate, occasionally united to form an extremely narrow continuous margin. *Spines* in pairs at the apex of the crenations, 10—25 mm. apart along the wing margins, up to 7·5 mm. long. *Leaves* rudimentary, ovate deltate, acute, recurving between the spines, the dried remains usually persistent, when deciduous leaving a pair of minute prickles. *Inflorescence* an axillary, very shortly pedunculate single cyme of 3 cyathia; the bibracteate peduncle very stout, c. 2·5 mm. long, 4 mm. diam.; bracts more or less very broadly ovate, somewhat fleshy towards the base, c. 4 mm. long, 7 mm. broad, usually split to the base. The 3 cyathia are arranged in planes at various angles to the axis of the branch; the central cyathium male, persistent; the lateral bisexual cyathia raised on short stout cyme branches; bracts more or less depressed ovate, 3·5—5 mm. long (sometimes exceeding the glands) 7·5 mm. broad, usually split nearly to the base, with a fleshy basal ridge almost or quite encircling the involucre. *Involucre* very broadly funnel shaped, glabrous, very fleshy, up to 10 mm. diam., 4·5 mm. long, with 5 transversely broadly elliptic, irregularly dentate erect lobes, which are somewhat fleshy towards the base; the 5 glands are very fleshy, more or less irregularly transversely narrowly elliptic, 5—5·5 mm. in their greater diam., spreading, with the upper surface yellow, rugulose, deeply concave, with the margins erect, the outer somewhat crisped. *Staminate flowers* numerous (about 60), arranged in 5 bracteate fascicles, with the laciniate fimbriate bracteoles c. 4 mm. long and the broad, slightly fleshy laciniate fimbriate fascicular bracts about the same length. *Pistillate flower:* ovary 3-lobed, obovoid, subsessile, included in the involucre, with a fleshy, somewhat 3-lobed dentate calyx; the ovule is suspended under a fleshy, minutely denticulate hood; styles 2·75—3 mm. long, free almost to the base, spreading recurved, with shortly bifid rugulose apices. *Capsule* very deeply 3-lobed, 19—23 mm. diam., 8·5—9·5 mm. high, truncate, eventually exserted on a stout gynophore up to 7 mm. long; calyx irregularly deltate with the apices acute or dentate. *Seed* subglobose c. 3·75 mm. diam., smooth, cream coloured, heavily marked with violet-brown dots, suture not raised.

It is with great pleasure that the new species is named for Professor A. S. Boughey of the University College of Rhodesia and Nyasaland; it is due in no small measure to his enthusiastic encouragement of the amateur botanist that the present study of the Succulent Euphorbias of the Flora Zambesiaca area has been embarked on by the author. Prof. Boughey collected a living plant of the new species in 1958, this was successfully cultivated in the College gardens and it is from this plant that the type material was obtained.

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Mrs. Mary Ball of Beitbridge, S. Rhodesia, for a living plant of *E. malevola* and other *Euphorbia* plants from various localities in S. Rhodesia.

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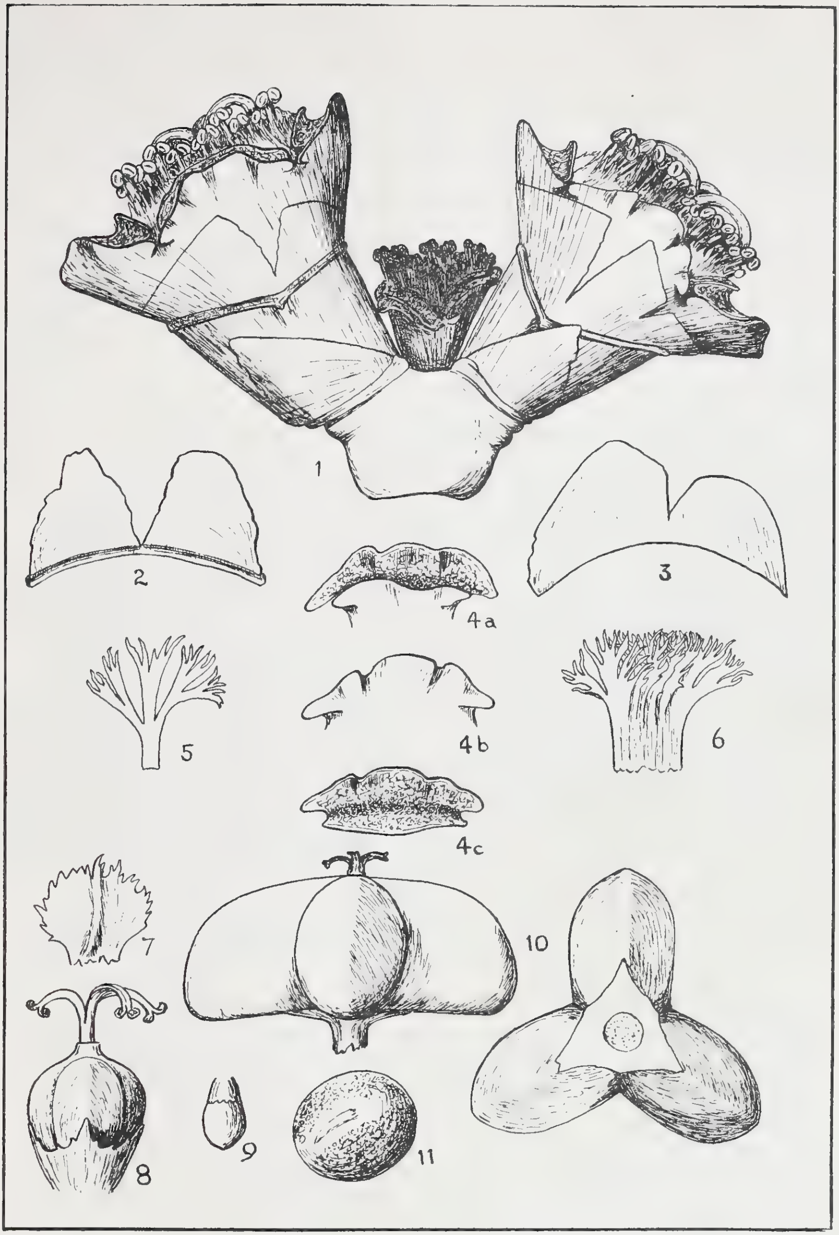


FIG. 1. *E. bougheyi* Leach.

(1) Cyme.
(2) Peduncular bract.
(3) Involucral bract.
(4) Involucral gland.
(5) Bracteole.
(6) Fascicular bract.
(7) Involucral lobe.
(8) Ovary.
(9) Ovule.
(10) Capsule.
(11) Seed.

NOTE ON ECHIDNOPSIS SQUAMULATA (DCNE) BALLY (SOUTHERN ARABIA)

With an Amplified Description

J. J. Lavranos

(With Plates VI and VII)

In the year 1837, the botanist Paul-Emile Botta was sent by the French Museum of Natural History to the Yemen. He made fairly extensive collections in the southern sector of the Western Yemeni escarpment and in the mountains and plateaux surrounding the town of Ta'izz.

The important collections made by Botta were dealt with, in part, by Decaisne in *Ann. Sc. Nat.* (1838) 257–278 and 321–348 and in *Arch. mus. d'hist. nat. Paris* 2 (1841) 89–199 but the work was, unfortunately, never completed.

During a botanical journey to South Western Arabia in August, 1962, I collected, on the Audhali Plateau, some 140 miles N.E. of Aden, a plant belonging to the genus *Echidnopsis* Hook. f., with long, tubular flowers (Lavranos 1822). When I sent photographs of this plant to Mr. P. R. O. Bally, at Geneva, he drew my attention to one of Botta's plants described by Decaisne in *Ann. Sc. Nat.* (1838) 263, as *Ceropegia squamulata* Dcne. and which appeared to conform rather closely with the plants found by me on the Audhali Plateau. Mr. Bally thought that the two might be conspecific.

Botta's plant was, in fact, described as having stems "teretibus, squamulosis, squamulis spiraliterque dispositis", a description reminiscent rather of *Echidnopsis* than of *Ceropegia;* the corolla is stated to be urceolate with triangular lobes connate at their tips.

Decaisne, in his comments on the species, (*l.c.*) states that he intended to create a new genus based on this plant, but that thorough comparison with material from India led him, in the end, to attribute it to *Ceropegia.*

It may be noted that Decaisne described his species from herbarium material only and those who have had experience of the deformations which the flowers of succulent Asclepiadaceae are subject to when dried and pressed, will realise that a description based solely on such material may contain certain discrepencies. Moreover, the only flower available is in shreds through dissecting and it is now very difficult indeed to form an exact opinion of its original shape. One has, therefore, to rely on the drawing which accompanies the description (*l.c.* Plate 9–B).

Prof. H. Huber, in *Revision der Gattung Ceropegia, Mem. Soc. Brot.* 12; 177 (1957) mentions Decaisne's *Ceropegia squamulata* among his *species excludendae* and points to its probable affinity with the genus *Echidnopsis*. Mr. Bally (Conservatoire Botanique de L'Université, Geneva) examined the type sheet in Paris, in January 1963 and confirmed this identification. He subsequently published the new combination, *Echidnopsis squamulata* in *Deutsche Sukkulentenzeitschrift* (*Kakteen und andere Sukkulenten*), 14 (9), 173–174 (1963).

By courtesy of the French Museum of Natural History, Paris, I was able to examine the type sheet of the species when it was sent to the Division of Botany, Pretoria, where it was photographed.

In March, 1963, another plant of *Echidnopsis* (Lavranos 1869) from near Dhala in the Amiri highlands North of Aden, produced a single flower which conforms, in almost every respect, with Decaisne's description.

It is now possible to give a more complete description of this species, based on Lavranos 1869.

Echidnopsis squamulata (Decaisne) Bally in *Deutsche Sukkulentenzeitschrift* (*Kakteen u.a. Sukkulenten*), 14(9), 173–174 (1963). *Ceropegia squamulata* Dcne., in *Ann. Sc. Nat., Paris,* (1838) 263 *cum tab.* 9(B); Deflers in *Voyage au Yemen* (1889) 167; in *Mém. Inst. Egypte*, 3 (1896) 265; Blatter in *Flora Arabica-Rec. Bot. Surv. Ind.*, (1919–1936) 300; O. Schwartz in *Fl. Trop. Arab. -Mitt. Inst. Allg. Bot. Hamburg*, (1939) 192; H. Huber in *Mem. Soc. Brot.* 12 (1957) 177.

DESCRIPTION

Stems 7—8 angled, tuberculate-tesselate, procumbent, forming dense mats, up to 15 cm. long, 8 mm. diam., grey-green with a brownish tinge, densely but minutely setulose throughout.

Leaves 1 mm. long ovate-deltoid, soon deciduous.

Flowers in pairs on new growth of stems, developed successively.

Pedicel terete, glabrous, 5—6 mm. long, 1 mm. diam., pale green, densely covered with minute reddish-brown spots.

Sepals lanceolate, acute, 3 mm. long, somewhat reflexed, glabrous, pale green with minute reddish-brown spots.

Corolla urceolate, obscurely 5-angled in section, 14 mm. long, 5 mm. diam. at its widest point above the base, narrowing gradually to 2 mm. below the mouth, thereafter expanding to 4 mm. between apices of lobes; *outer surface* of tube, uniformly red-brown, glabrous, vernicose; *inner surface* glabrous, red-brown; *lobes* broadly deltoid, acute appr. 2 mm. broad at base and 2·5 mm. long, ascending towards the centre, the apices bent abruptly outward, red-brown inside, greenish yellow outside with numerous small red-brown spots.

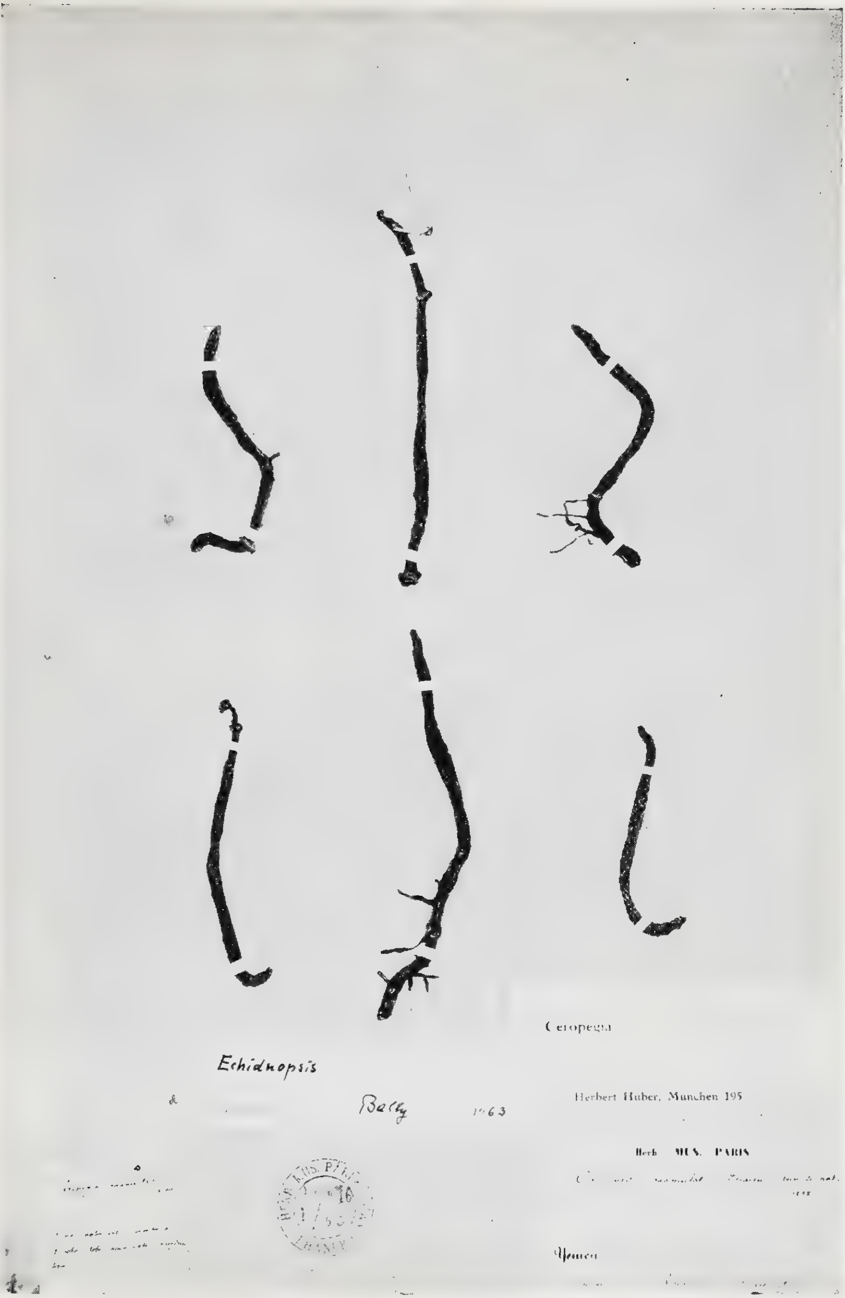


PLATE VI.

E. squamulata (Decaisne) Bally. The type sheet.
Photo: Division of Botany, Pretoria.

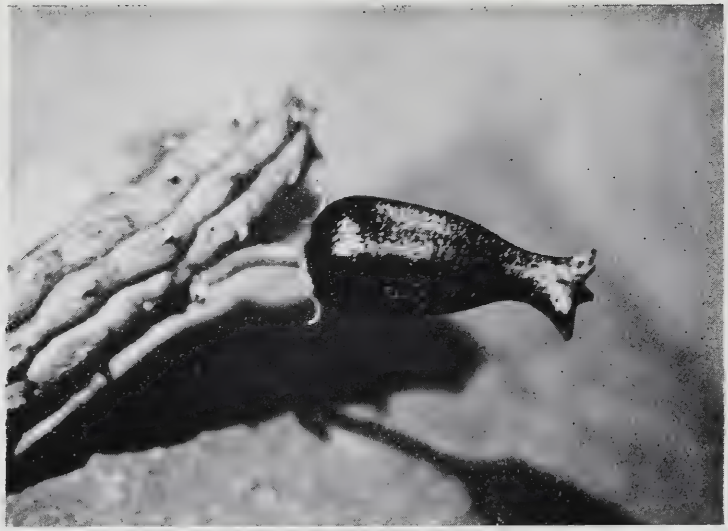


Fig. 1. Bud.

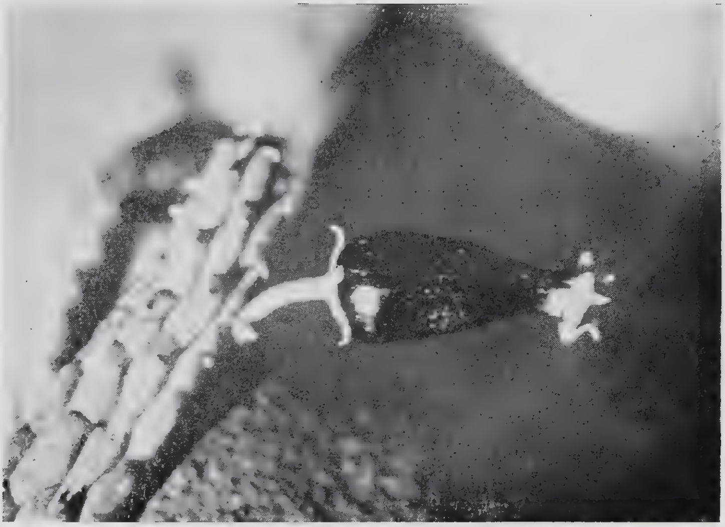


Fig. 2. Mature flower.

Plate VII. *Euphorbia squamulata* (Dcne) Bally.

Outer corona 3·5 mm. diam., appr. 2 mm. high, cupular, obtusely 5-lobed, glabrous, red-brown, with entire, revolute margin, internally divided into 5 compartments by the inner corona lobes.

Inner corona lobes linear, subulate, ascending at first and incumbent upon the anthers, thereafter connivent in an erect column, pale pink at first, darker towards the apices which are not divergent.

DISTRIBUTION: Yemen, in Wadi Sina, near Ta‘izz, anno 1837, leg. P.-E. Botta, type (P); 4 miles N.E. of Dhala in the Amiri highlands, lat. 13° 43′ N., long. 44° 46′ E., south of the Yemeni border, alt. appr. 1450 m. Lavranos 1869, coll. Aug. 24 1962, fl. Johannesburg March 25 1963 (PRE). The species appears to occur on the basalt plateaux between Dhala and Ta‘izz, a distance of some 50 miles, at altitudes in the vicinity of 1500 m.

Decaisne describes the corolla lobes of *Ceropegia squamulata* as coalescent at their apices (apice coalescentibus). It would seem that the only flower collected by Botta was an almost mature bud and that, consequently, the corolla lobes appeared—in the dried and pressed specimen—to be coalescent. A comparison of the original drawing and the photograph of a bud which accompany this text seems to corroborate this view.

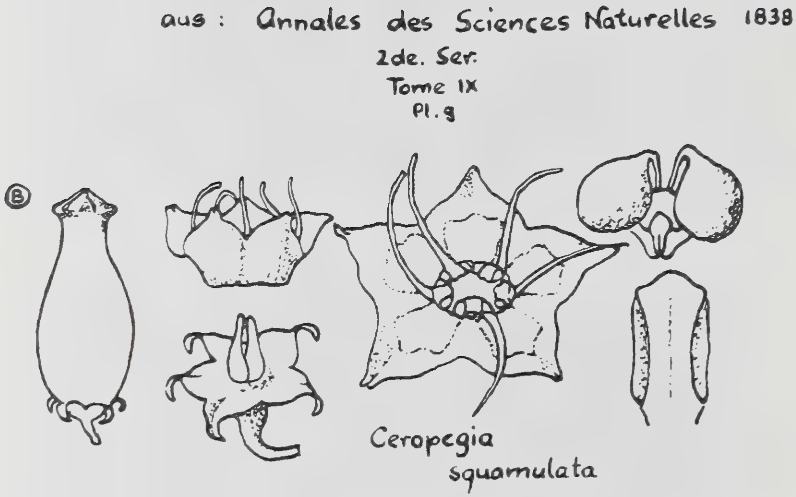
The outer corona is not rotate but cupular. In the original drawing it appears to be more deeply lobed than in the specimens collected by me. This may be due to variability in the development of the outer corona lobes but it could also be caused by shrinkage in the process of drying.

The original drawing shows the inner corona lobes as erect from their base. This may be attributed to the deformations suffered by the flower in the press.

While Botta's plant was collected in the Wadi Sina near Ta‘izz in the Yemen, my own specimen was found near Dhala, some 50 miles to the East, at about the same altitude and in almost identical conditions of climate, soil and vegetation.

My plant was found growing on a low hill of basaltic rock in a association with *Aloe* sp., an *Euphorbia* of the sect. *Diacanthium*, (possibly *E. parciramulosa* Schweinf.), *Arisaema flavum* (Forsk.) Schott, *Dorstenia* cf. *barnimiana* Schweinf., *Anisotes trisulcus* (Forsk.) Nees, and *Senecio anteuphoribum* (L) Sch. Bip. var. *odorus* (Forsk.) Rowley.

The taxonomic position of the plants from the Audhali Plateau (Lavranos 1822, 1823, 1830, 1841 and 1848) is not yet clear. They—and possibly also Lavranos 1759, collected on the arid Jahhayn flats—may eventually prove to belong to *E. squamulata*. It is hoped that this matter will be settled once flowering material from the above collection numbers becomes available for comparison. Fortunately all these plants are at present in cultivation.



E. squamulata.

The original drawing by Decaisne.

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A NEW CARALLUMA FROM THE HADHRAMAUT, SOUTHERN ARABIA

J. J. Lavranos

(With Plates VIII and IX)

Caralluma foulcheri-delboscii Lavranos nov. sp. affinis *C. hexagonae* Lavranos sed caulibus uniforme tetragonis, floribus minoribus, lobis corollae adscendentibus, ovatis, lobis coronae exterioris adscendentibus differens.

Caules glabri, ascendentes vel erecti, 10—40 mm. longi, 12—15 mm. lati, quadrangulares, latibus planis vel leviter convexis, angulis sinuato-dentatis, dentibus obtusis; folia minuta, mox decidua; flores 3—8 in fasciculis apicalibus aggregati; bracteae lineares, breves; pedicelli teretes, glabri, 4—6 mm. longi; sepala ovata deltoidea, carinata, viridia, 1·2 mm. longa; corolla rotata-campanulata, tenus 12 mm. diam. inter apices loborum, extus albo-virens, sparse rubro-brunnea punctata, intus albescens, dense maculis rotundatis, convexis, rubro-brunneis—ad apices loborum confluentibus induta, glabra; tubus 2 mm. longus, 4·5 mm. diam.; lobi ovati, acuti, adscendentes, 4 mm. longi, basi 4 mm. lati, extus 5-nervii; loborum apices pilis vibratilibus, simplicibus, compressis, fuscis rubro-brunneis, 2 mm. longis, fasciculatis muniti; corona exterior cyathiformis, fusca rubro-brunnea, 4 mm. diam., lobis adscendentibus, 1·2 mm. longis, bifidis, segmentibus canaliculatis, arcuatis, divergentibus; coronae interioris lobi 1·2 mm. longi, haud conniventes, supra antheras arcte incumbentes, lineares, apice obtusi, fusci rubro-brunnei.

Type Locality: Hadhramaut, Southern Arabia, Southern rocky slopes of the Kor Seiban, North of Mola Matr, lat. 14° 46′ N., long. 48° 46′ E., alt. appr. 1,900 metres, coll. Aug. 22 1962, fl. Heidelberg, June 18 1963, Lavranos 1943, (HEIDELBERG, holotype; KEW, isotype).

Plant succulent, branching freely and forming low, dense groups.

Stems glabrous, glaucous-green ascending, branching, 10—40 mm. long, 12—15 mm. thick, uniformly quadrangular with flat or somewhat convex sides and sinuate-dentate angles, the teeth obtuse.

Leaves minute, soon deciduous.

Flowers 3—8 in fascicles from the apices of young stems.

Bracts linear, short.

Pedicel terete, glabrous, 4—6 mm. long.

Sepals ovate-deltoid, carinate, green, 1·2 mm. long.

Corolla rotate-campanulate, up to 12 mm. diam. between apices of lobes; *outer surface* pale green with a few red-brown, roundish, convex spots; *inner surface* creamy-white, densely covered with red-brown, round, convex spots, which become confluent at the apices of the lobes, but are absent at the base of the tube, glabrous except for a tuft of dark red-brown, simple, compressed, vibratile hairs, up to 2 mm. long at the apex of each lobe; *tube* 2 mm. long, 4·5 mm. diam.; *lobes* ovate, acute, ascending, 4 mm. broad at base, 4 mm. long, outside 5-nerved.

Outer corona cupular, dark red-brown, 4 mm. diam. including the lobes which are 1·2 mm. long, ascending, bifid from about the middle, with arcuately divergent, horn-shaped, canaliculate segments.

Inner corona lobes linear with rounded apices, 1 mm. long, closely incumbent upon but shorter than the anthers, dark red-brown.

This new species is a close ally of *C. hexagona* Lavr. from the Audhali plateau, 200 miles to the West. It differs, however, in being a much less robust plant, with uniformly square stems and rather acute angles, while in *C. hexagona* the stems are usually six-angled with rounded angles. In *C. foulcheri-delboscii* the flowers are very much smaller than in its ally, with ascending, ovate lobes. The outer corona is distinctly cup-shaped with ascending lobes. In *C. hexagona* the lobes both of the corolla and of the outer corona spread horizontally.

C. foulcheri-delboscii was found growing among limestone rocks on the steep southern slopes of the Kor Seiban, highest of the Hadhramaut mountains, about 3 miles North of Mola Matr, which is 54 miles by road to the North of the port of Mukalla. It grows, at the type locality, in considerable numbers and in association with *Acacia* spp., *Ficus salicifolia* Vahl, *Tarchonanthus camphoratus* L., *Dodonaea viscosa* L., *Kalanchoe teretifolia* Defl., *Pancratium maximum* Forsk., *Euphorbia phillipsiae* N.E. Br., *Dorstenia foetida* (Forsk.) Shweinf., various Stapelieae and many Acanthaceae. The species was also collected at various other points in the vicinity of Mola Matr, but not below 1,500 metres.

Living plants which I sent to Prof. Dr. W. Rauh at the University of Heidelberg, Germany, flowered there on June 18 1963, when the excellent photographs accompanying this text were taken.

Professor Rauh has drawn my attention to one of the plants which he received under Lavranos 1943, which produced flowers that are sparsely spotted on the inner surface and have proportionately narrower and longer corolla lobes. In spite of these differences, the plant in question is merely a form of *C. foulcheri-delboscii.*

The species here described is named in honour of Mr. J.-M. Foulcher-Delbosc, of Bergerac, France, in recognition of his love of succulent plants and of his generous contribution towards the cost of my journey to Southern Arabia.

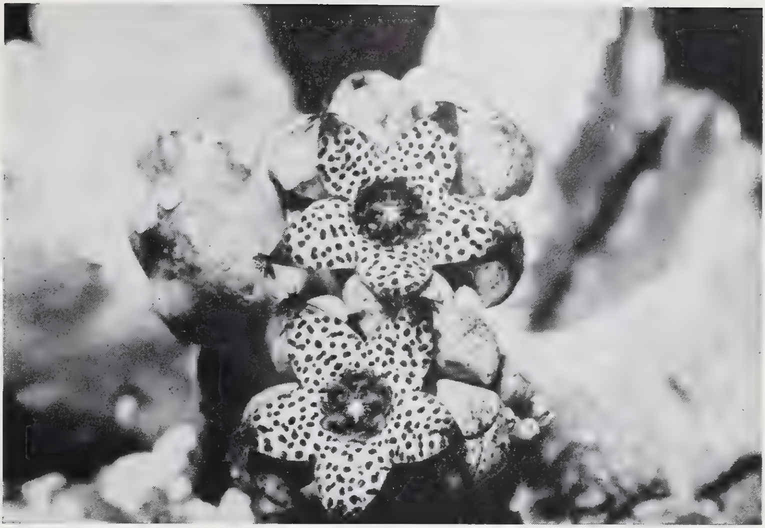

FIG. 1. Fascicles of flowers x3.

Photograph: Prof. Dr. W. Rauh.

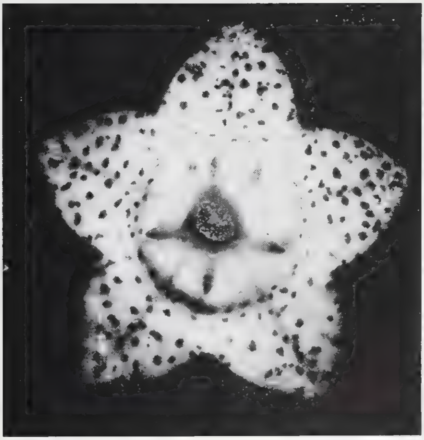

FIG. 2. Outer Corolla surface showing tube and sepals x5.

Photograph Prof. Dr. W. Rauh.

PLATE VIII. *Caralluma foulcheri-delboscii.*

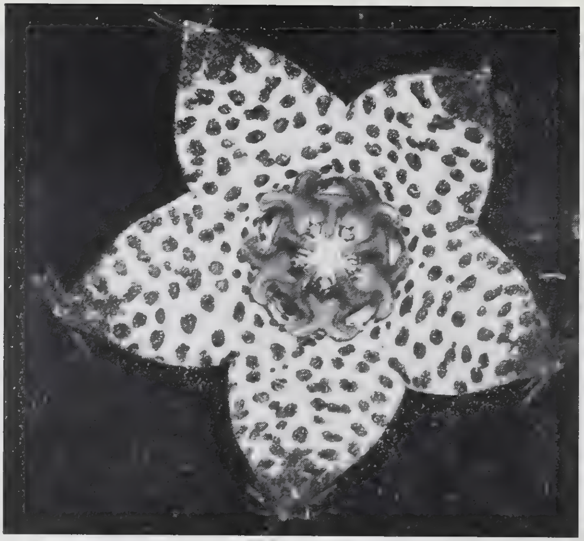

FIG. 1. Flower x6½.

Photograph: Prof. Dr. W. Rauh.

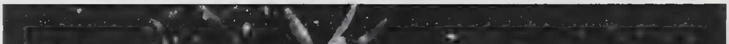

FIG. 2. Dissected flower showing the coronal structure x8

Photograph: Prof. Dr. W. Rauh.

PLATE IX. *Caralluma foulcheri-delboscii.*

ACKNOWLEDGEMENTS

I am much indebted to:

The High Commissioner, Aden, for permission to visit the Hadhramaut and for much other help. My special thanks go to Mr. F. A. H. Wilson, formerly of that Office, for giving me every possible assistance, much useful information and sound advice.

Mr. Arthur Watts, Resident Adviser, Mukalla, and, to Mr. W. Wise of the same Office, for authorising my visit to Mola Matr and for supplying me with transport to that locality.

Mr. George Keller, of the Residency, Mukalla, for doing everything possible to further my plans and for the personal interest which he showed in my undertaking.

Messrs. J.-M. Foulcher-Delbosc and J. Marnier-Lapostolle, of France, for financial contributions which helped to cover the cost of my expedition.

Professor Dr. W. Rauh, of the University of Heidelberg, Germany, for the excellent photographs which accompany this paper.

Mr. C. Meintjes, formerly of Aden, for his efforts on my behalf in preparing my various journeys to the interior of S. Arabia and for his company.

The Chief, Botanical Research Institute, Pretoria, for the use of the facilities of the National Herbarium and for his help and advice over many years.

ON A HUERNIA FROM NIGERIA AND A CARALLUMA FROM SOUTH WESTERN ARABIA

J. J. Lavranos

1. **Huernia volkartii** Gossweiler var. **nigeriana** (Lavr.) Lavranos stat. nov. **Huernia nigeriana** Lavranos in *Journ. S. Afr. Bot.* 27 (1961); 233.

At the time of describing the above plant, the author held that it differed sufficiently from *H. volkartii* Gossw. to deserve specific status.

Subsequent observations have, however, led to the conclusion that the differences are not adequate to warrant specific status.

Nevertheless, the plants from Nigeria appear to differ sufficiently from the type to deserve varietal rank.

2. **Caralluma baldratii** White et Sloane in "*The Stapeliae*" (1937); 268. **Caralluma meintjesiana** Lavranos in *Journ. S. Afr. Bot.* 28 (1962); 209.

Mr. P. R. O. Bally and, more recently, Prof. Dr. W. Rauh, have drawn the author's attention to the very close affinities of the form described by him as *C. meintjesiana* to *C. baldratii* White et Sloane.

The author had based his species on material sent by Mr. C. Meintjes from the Audhali Plateau in the Southern Arabian Federation.

In August 1962, during a botanical journey to South Western Arabia, the author made several collections of this species and examined many flowers thereof. These observations have led to the conclusion that the plants from the Audhali Plateau belong indeed to *C. baldratii* and *C. meintjesiana*, is, therefore, reduced into synonymy under that species.

C. baldratii was originally described from the highlands of Eritrea and has also been collected in Kenya (P. R. O. Bally, *East African* succulents IV. (1942); 156). The species has, therefore, a very wide range of distribution. Whether the plants from Kenya and S.W. Arabia deserve varietal status is not entirely clear.

The author considers it unfortunate that an excess of enthusiasm on his part led him to create a new species where it should have been fairly clear that this was not warranted by facts. The creation of new taxa without due justification can only lead to confusion and, although the oversight should not have occurred in the first instance, it is hereby rectified.

BOOK REVIEW

FLORA AFRICANA. South African Botanical Books 1600–1963. A selective bibliography based on the collections of the South African Public Library (with the addition of items from the Bolus Herbarium of the University of Cape Town), compiled by W. Tyrrell-Glynn, with the assistance of M. R. Levyns. Published in commemoration of the Kirstenbosch Jubilee. Cape Town, South African Public Library, 1963. (Grey Bibliographies, No. 8), (x), 77 pp., 8 pl.

This well-produced, alphabetical bibliography of 244 books and 30 series of periodicals, with annotations in English and Afrikaans, gives an enumeration of the most important publications on the flora and vegetation in two of the larger botanical library collections in Cape Town. Most of the works described have been exhibited at the S.A. Public Library in February, 1963. The list is a useful record of what *books* are locally available although it is not (and does not pretend to be) complete. No reference to papers in journals is made, except in a few cases where they are (or were) available as reprints. The bibliography is an interesting item for collectors rather than a guide for beginners or a reference work for advanced students of South African flora. But there will almost certainly be an intermediate category of botanists who will find it useful.

W. J. LÜTJEHARMS.

A NEW SPECIES OF OTHONNA

Bertil Nordenstam

(*Smuts Memorial Fellow, Kirstenbosch, 1962/63*)

Othonna hallii B. Nord. sp. nov.

Differt a *O. spektakelensis* Compton, foliis minoribus succulentibus (non herbaceis, reticulatis), marginis foliorum laevis vel leviter denticulatis (non manifeste et dense denticulato-ciliatis).

Rootstock short, obconical or turnip-shaped, hard and woody, up to 4 cm. in diam., abruptly tapering to a vertical taproot.

Leaves rosulate from the crown, with white wool between the bases, numerous, ascending, glabrous, oblanceolate or spatulate, 2—8 cm. long, 0·3—2 dm. wide, thickish and somewhat fleshy, without distinct venation (except sometimes when dry), dull green or slightly glaucous, often red or purplish near the base. *Leaf-margins* smooth or minutely and laxly denticulate. *Leaf-tips* obtuse or rounded.

Peduncles solitary or a few together from the crown, scapose, erect, forking repeatedly to a lax panicle, normally 12—20 cm. high, glabrous, often somewhat purplish.

Involucral bracts 5—8, connate to $\frac{1}{4}$—$\frac{1}{3}$, ovate, 4—5 mm. long, unnerved, narrowly membrane-edged, acute, often with purplish tips.

Ray-florets 5—8, yellow; *tube* 1·5 mm. long, cylindric; *lamina* oblong, 5—7 mm. long, 2—3 mm. wide, minutely dentate at the apex; *style* terete; *branches* flattened, 1 mm. long, obtuse; *pappus bristles* numerous (c. 50—60), straight, erect, white, 1·5—2 mm. long. *Achene* oblong-obovate, 2 mm. long, 1·5 mm. wide at the top, densely white-villous.

Disc-florets sterile, 3 mm. long (excl. ovary), campanulate above; *lobes* deltoid, c. 0·8 mm. long; *pappus bristles* few to several (5—20) or sometimes numerous on the outer florets, white, 1·5 mm. long; *style* terete, tipped with a short cone with a basal ring of sweeping-hairs; anthers 1·2 mm. long incl. the ovate subacute appendage.

Holotype: Nordenstam 795 (LD). Isotypes to be lodged at BOL, K, NBG, PRE, S,M.

Flowering period: (May—) July—August.

Vanrhynsdorp: Koekenaap, NBG 361/54, H. Hall s.n., flowered in Kirstenbosch, May 7 1953 (NBG); 4 m. N of Holriver bridge, July 28 1962, Nordenstam

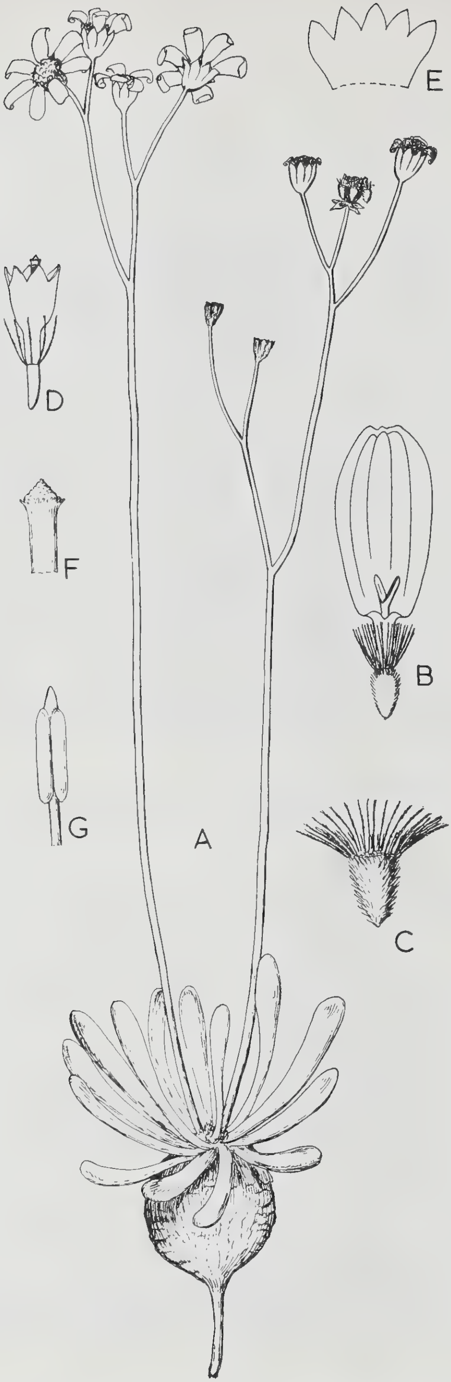

FIG. 1. *Othonna hallii*, plant from type collection, grown in Kirstenbosch. A Habit, nat. size. B Ray-floret, x5. C (Ray) achene, x5. D Disc-floret, x5. E Corolla of disc-floret, split up, x5. F Tip of disc style, x15. G Anther, x15.—Del. auct.

795 (LD), and Aug. 10 1962, Nordenstam 893 (LD); 6 m. N of Koekenaap on Nuwerus road, Aug. 11 1962, Nordenstam 939 (LD).

The new species is named after Mr. Harry Hall of Kirstenbosch, who first collected it. It comes closest to *Othonna spektakelensis* Compton, but differs from this in a number of characters. The leaves are succulent, not thin and with obvious venation. The leaf-margins are never as distinctly denticulate-ciliate as in *O. spektakelensis*, although a lax and minute denticulation sometimes occurs, esp. in plants from Koekenaap. In addition, *O. spektakelensis* normally has larger capitula, broader and shorter rays, and is generally more robust. In their ecology and geographical distribution the two species are rather different. *O. spektakelensis* is confined to stony shaly soil in a small area west of Springbok in Little Namaqualand. *O. hallii* is only known from two localities among quartzite pebbles just north of the Olifants River.

The two populations of *O. hallii* differ slightly in some respects. In the plants from Holriver the leaves are more fleshy and narrow, and the leaf-margins are normally quite smooth. The Koekenaap plants have broader and thinner leaves with usually minutely denticulate margins. Although these differences are maintained in cultivation, I regard them as too insignificant to justify a taxonomic distinction between the two populations even at varietal level.

It is not impossible, that *O. hallii* may be found in similar localities on Knersvlakte proper. It is likely, however, that it is endemic to the quartzite areas in Vanrhynsdorp Division, like many other species and even genera of various families.

ACKNOWLEDGEMENTS

The author's research in South Africa has been made possible by tenure of the Smuts Memorial Fellowship (Cape Town), and by grants from the Swedish Natural Science Research Council, the Royal Swedish Academy of Science, and the Lennander Foundation (Uppsala).

A NEW ALOE FROM ANGOLA

G. W. Reynolds

(With Plates X and XI)

Aloe mendesii Reynolds. Species nova, affinis *A. veseyi* Reynolds, foliis magis latioribus, bracteis majoribus, pedicellis longioribus differt.

Planta succulenta, caulibus et foliis et inflorescentia pendentibus, caulibus usque 1 m. longis. *Folia* c. 10, rosulata, ensiformia, 7—8 cm. lata, sensim attenuata et c. 50 cm. longa; *supra* viridia, obscure lineata, planiuscula; *subtus* leviter convexa; marginibus dentibus cartilagineis 1—2 mm. longis, irregulariter 10—15 mm. distantibus armata. *Inflorescentia* pendens, c. 60 cm. longa, 3—4 ramosa. *Racemi* arcuato-adscendentes, cylindrico-conici, 8—10 cm. longi, 5—6 cm. diam. *Bracteae* ovato-acutae, scariosae, 10—12 mm. longae, 4 mm. latae, albidae, 5-nervatae. *Pedicelli* 20 mm. longi. *Perianthium* coccineum, 25 mm. longum, basi breviter stipitatum; *segmenta exteriora* per 6 mm. libera ut videtur. *Antherae* 2—3 mm. exsertae. *Stigma* demum 3 mm. exsertum. *Ovarium* 5 mm. longum, 2 mm. diam. (Plates X and XI.)

Angola. Huila District: Lubango, Humpata, Buraco do Bimbe, 2220 m., in bud April 22 1960, E. J. Mendes 3815 (LISC); Bimbe, May 3 1963, R. Santos 1109 (LISC, LUAI)—leaf only with portion of undeveloped raceme; Humpata, Tundavala escarpment, alt. c. 2220 m., July 4 1963, R. Santos et C. Henriques 1131 (LISC, holotype; LUAI, isotype).

Our distinctive new species is named after Dr. E. J. Mendes (Centro de Botânica, Lisboa) who discovered and photographed it in January 1956 on precipice faces of the Serra da Chela, on the western escarpment of Humpata plateau at Bimbe which is approximately 25 Km. (15 miles) W. of Sá da Bandeira, Huíla District, at an altitude of 2220 m. In April 1960, Dr. E. J. Mendes went to Angola again and tried to collect good material at the same locality, but at that time racemes were in young bud only, and open flowers were not available.

Subsequently, in May and in July, 1963, Sr. R. Santos and Sr. C. Henriques (Instituto de Investigação Científica de Angola, Luanda) collected plants again on the Bimbe and rediscovered and collected them also on the Tundavala escarpment which is about 18 Km. (11 miles) N.E. of Bimbe and 16 Km. (10 miles) N.W. of Sá da Bandeira, when plants were mostly in fruit with few flowers left. No spirit material was made, so it is therefore not possible at this stage to figure flowers natural size. It seems that perianth outer segments may be free for about 6 mm.

It appears that *A. mendesii* is closely allied to *A. veseyi* Reynolds from Kalambo Falls, 22 miles N. of Abercorn, Northern Rhodesia. Both species hang downwards on precipice faces, mostly with western aspect, both have similar branched inflorescences with only the racemes arcuate-ascending, and both have 25 mm. flowers.

A. mendesii differs from *A. veseyi* in having much broader unspotted leaves, much longer bracts, and longer pedicels.

Description

Plant pendent, clinging to precipice faces, with stems up to 1 m. long, 4 cm. diam.

Leaves about 10, all hanging downwards, ensiform, 50 cm. long, 7—8 cm. broad; *upper surface* green, obscurely lineate, without spots, flat to very slightly canaliculate; *lower surface* slightly rounded, otherwise as upper surface; *margins* with narrow cartilaginous edge with firm cartilaginous blunt teeth 1—2 mm. long, irregularly 10—15 mm. apart.

Inflorescence pendent with only the racemes arcuate-ascending, about 60 cm. long, 3—4-branched.

Peduncle basally plano-convex and 10—15 mm. broad, 3—4-branched.

Racemes cylindric-conical, subdensely flowered, 8—10 cm. long, 5—6 cm. diam., the youngest buds at first hidden by densely imbricate bracts, open flowers cernuous to sub-pendulous.

Bracts ovate-acute, thin, scarious 10—12 mm. long, 4 mm. broad, 5-nerved.

Perianth scarlet, cylindric slightly ventricose, 25 mm. long, basally shortly stipitate; *outer segments* probably free for 6 mm; *anthers* exserted 2—3 mm; *stigma* at length exserted 3 mm.

ACKNOWLEDGMENTS

I am deeply indebted to:

Dr. E. J. Mendes, Centro de Botânica, Junta de Investigações do Ultramar, Lisboa, for plants, photographs and much data concerning this new species, and several other species of Aloe in Angola.

Eng. L. Grandvaux Barbosa, Instituto de Investigação Científica de Angola, Luanda, for colour-slides of the Tundavala material.

Sr. R. Santos and Sr. C. Henriques, Instituto de Investigação Científica de Angola, Luanda, for their help in obtaining flowering and fruiting specimens.

Dr. R. A. Dyer, at that time Chief, Botanical Research Institute, Pretoria, for the facilities of the National Herbarium, Pretoria.

The South African Council for Scientific and Industrial Research, for travelling grants that have enabled me to investigate the Aloes in Angola and elsewhere in Africa.

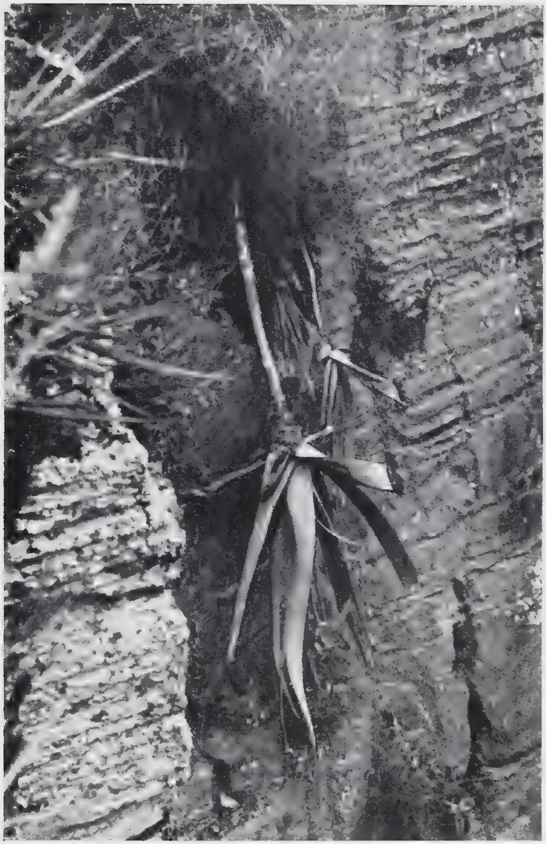

PLATE X. *Aloe mendesii* Reynolds. Whole plant pendent on precipice face at Bimbe, 25 Km. West of Sá da Bandeira, Huíla Dist., Angola. Approx. × 1/10. *Photo:* DR. E. J. MENDES

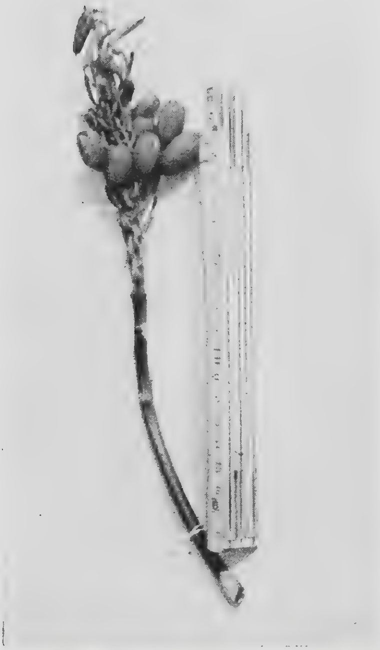

Plate XI. *Aloe mendesii* Reynolds. Raceme × approx. 1/4. *Photo:* ENG. L. GRANDVAUX BARBOSA

NOTES ON MESEMBRYANTHEMUM AND ALLIED GENERA

H. M. L. Bolus

Astridia herrei L. Bol. sp. nov.—Planta 1 visa, fera viva senectissima robusta glabra, 30 cm. alta, caule ad 2·7 cm. diam.; rami primarii ad 2·5 cm. diam., internodiis 1—2 cm. longis, secondarii 1 cm. diam., internodiis ad 2·5 cm. longis; folia primum erecta, demum patentia, nunc digitiformia, ad 7·5 cm. longa, medio 1 cm. lato, 1·4 cm. diam., nunc subfalcata, 5—7 cm. longa, medio 7—9 mm. lato, 1·6 cm. diam., vagina 2—3 mm. longa, supra visa superne convexula, obtusa, lat. visa superne leviter angustata, apice obtuso vel rotundato, lateribus convexis, dorso fere rotundato, carina ad lineam obscuram reducta, tactu asperulo, grisea, purpureo suffusa ("slaty pink") marginibus carinaque juvenilium rubre lineatis; flos 1 visus; pedunculus apice bracteatus, 5 mm. longus; bracteae acutissimae, marginibus leviter excavatis, 1·2 et 1·3 cm. longis, prope basim ad 7 mm. diam.; receptaculum semiglobosum, in vagina bractearum inclusum, 4·5 mm. longum, 9 mm. diam.; sepala extima e prope basim superne angustata, acuta, 9 mm. longa, basi 7 mm. lata, interiora e supra medium acutissime subulata, ample marginata, basi 4—5 mm. lata; petala ca. 6-seriata, e prope medium inferne angustata, exteriora obtusa, rubra, intima acuminata, in staminodia transeuntia, inferne pallida, 1·4—2·6 cm. longa, 0·5—2 mm. lata; staminodia stamina superantia; filamenta 6—7-seriata, ad 1·1 cm. longa, inferne pallida, superne aurea, inferne dense ciliate papillata, interiora etiam prope apicem dense papillata, antheris pollineque pallide luteis; ovarii lobi erecti, ad 1 mm. elevati; stigmata inferne anguste subulata, superne longe attenuata, viridia, 6 mm. longa; capsulae infra late obconicae, 4—5 mm. longae, apice 9 mm., expansae 14 mm., diam., valvis suberectis manentibus, (hornotinae fere maturae infra ad 7 mm. longae, ad 1·5 cm. diam.), supra ad 4 mm. elevatae, suturis valde compressis; semina brunnea muricata, ad 1 mm. longa.

NAMAQUALAND; Aneesfontein, Oct. 1961, et Sept. 1963, *H. Herre*. S.U.G. 14693. Fl. Jul. 1963.

In the second collection of this species, two late flowers were seen by Mr. Herre, and an old and complete plant was taken out to serve as the type-specimen. "Other plants seen were about 50—60 cm. high. It grows there along the famous Heije Eibib, the 'wonder hole,' which is about 50 ft. deep and about 10 ft. in diameter." (*Herre.*)

The four collections of **Cephalophyllum pallens** L. Bol. cited below, as showing some variation from the typical form of this species, were made by R. C. Littlewood and are now in cultivation in the Karoo Garden at Worcester. The numbers given are those of the Karoo Garden Register.

557/62. Lorelei, May. "On western aspect of a hard rocky koppie exposed to strong coastal winds often laden with sand. Compact plant 24 cm. high, 33 cm. in diameter, stem at the base 2·5 cm. in diameter. In young plants a 'head' of 4 leaves occurs, the longest being 12·5 cm. long." (*Littlewood.*) The inflorescence is congested, the peduncles shorter, and the sepals longer (up to 1·5 cm.), than in the type. Fl. Aug. 1963.

553/62. Three miles S. of Lorelei, May. Sepals more acute than in the type. Fl. Aug. 1962.

555/62. Namies Kloof, "on sandy flats," May. Differs from the type in having shorter sepals, petals all yellow (not rose-suffused), anthers and pollen golden—"one branch rooting at the nodes." Fl. Jul. 1962.

758/61. Forty miles S. of Witputz, October. Leaves up to 12 cm. long, narrower than in the type, ultimate peduncles up to 5 cm. long, outer sepals in a rather old flower up to 2 cm. long and 1 cm. broad at the base, petals up to 3 mm. broad. Fl. Jul. 1962.

The two collections of **Cephalophyllum ausense** L. Bol. cited below, made by R. C. Littlewood, also differ from the typical form.

764/61. Two miles S. of Witputz, October. Leaves 2·5—3·6 cm. long, petals up to 2·6 cm. long, and 3·5 mm. broad, in other flowers on the same plant being the same breadth as in the type. Fl. Jul. 1962.

551/62. Nine miles S. of Witputz, May. Leaves as in the type, and the length of the petals in some of the flowers the same, in others up to 2 cm. long and slightly broader. Fl. Aug. 1963.

Conophytum koubergensis L. Bol. sp. nov. (*Celatistamina—Fenestrata*).—Plantae 2 visae; caulis 3—4 mm. diam.; vaginae persistentes papyraceae brunneae; corpuscula subpyriformia glabra, in siccis brunneo punctata, 1·7—2 cm. longa, 1 cm. lata, basi ad 5 mm., apice 1·2 cm., diam., ore obscurissime ciliolato, 4 mm. longo, fenestra convexa, in siccis parce punctata; pedunculus 6 mm. longus, bracteis prope basim positis, ca. 3 mm. longis; receptaculum 1 mm. longum, 1·5 mm. diam.; calyx non bene visus, segmentis 5 (?); corolla 1·5 cm. longa, tubo cylindrico, 5 mm. longo, segmentis 3-seriatis, exterioribus inferne angustatis, apice rotundato, ad 1·5 mm. latis; staminodia angusta; stamina 6-seriata alba, e basi tubi ad parum supra medium adnata; ovarium conice elevatum, discum superans; stylus nullus (?); stigmata non bene visa, 1 mm. longa.

BUSHMANLAND; Kouberg, "about 40 miles from Springbok," Apr. 1947, *P. van Heerde*. Bolus Herbarium 23435.

This species is nearest to **C. lithopoides** L. Bol. and differs chiefly in having papery resting-sheaths, glabrous bodies, longer peduncle and a much shorter corolla and stigmas. The description was made from dried dissections of a living body, and the measurements given of the flower are those of the only one of the four seen that was dissected. It is hoped that its publication may lead to further collections being made in this area.

Conophytum meridianum L. Bol. sp. nov. (*Celatistamina—Fenestrata*).—Planta 1 visa, e corpusculis 6 composita; vaginae persistentes inferne papyraceae brunneae, superne tenuiter pergamentaceae, griseae; corpuscula oblonge obovata, apice convexo, rubre brunnea, glabra, fenestra insulis brunneis ornata, 1—1·3 cm. longa, 5—6 mm. lata, ad 8 mm. diam., ore glabro vel in corpusculo unico obscure ciliolato, ad 1·5 mm. longo; flores 6 visi; pedunculi 4—6 mm. longi, parum supra basim bracteati; bracteae acute saturateque viride carinatae, aliter pallidae submembranaceae, ad 3 mm. longae, lobis subacutis, vagina duplo longioribus vel eam subaequantibus; receptaculum ad 1 mm. longum diametroque; calyx 5—6 mm. longus, parte quarta inclusa, membranaceus, segmentis 4, ad 1 mm. longis; corolla alba, 1—1·5 cm. longa, tubo 5—8 mm. longo, superne vix ampliato, segmentis 2-seriatis, apice rotundato, ad 1·5 mm. latis; staminodia 2-seriata, lutea, ad 2 mm. longa; stamina 2—3-seriata, infra medium tubi adnata, antheris pollineque pallidis; discus quasi e glandulis 4 coalitis compositus, altitudinem ovarii fere attingens; ovarium conice ad 1 mm. elevatum; stylus nullus; stigmata 4, 1·5 mm. longa.

VANRHYNSDORP; "between Vanrhynsdorp and Nieuwefontein (Kliprand)," Dec. 1938, *C. L. Leipoldt* 4415. Fl. hort. L. Bolus Feb.—Mart 1939.

The specific name is used here in its secondary meaning, signifying south or southern, and refers to the locality being the southernmost hitherto recorded for this series.

Conophytum stegmanianum L. Bol. sp. nov. (*Euconophytum—Carruicola*).—Plantae 2 visae, caespitosae, 4—5 cm. diam.; vaginae persistentes tenuiter pergamentaceae, friabiles, eis anni prioris inferne pallidissime brunneis, ceteris saturatioribus, ore minute ciliato, ciliis patentibus; corpuscula obconica, pallide viridia, basi subrotundo, apice convexulo, inconspicuissime viride punctato, punctis irregulariter dispositis vel interdum semicirculos formantibus, rare paucis approximatis, sed tamen non lineas formantibus, ore leviter depresso, ridente (ut in serie *Cataphracta*), ciliis non manifestis, 3—4 mm. longo, ad 1·2 cm. longa, 1 cm. lata, 1·3 cm. diam.; flores 4 visi, ad 1·4 cm. diam.; pedunculus 5 mm. longus, prope basim bracteatus, bracteis obtusis, ca. 2 mm. longis, vagina lobis parum breviore; receptaculum 1·5 mm. longum, 2 mm. diam.; calyx herbaceus, rubre brunneus, 5—6 mm. longus, tubo 3 mm. longo, segmentis 6 vel in flore unico 5 (stigmata tamen 6!), superne angustatis, obtusis

vel subacutis, omnibus ± marginatis, subaequilongis vel 1—2 mm. longis; corolla 9—11 mm. longa, tubo 3—4 mm. longo, segmentis ca. 3-seriatis, exterioribus obtusis, intimis acutis, albidis vel pallidissime roseis, ad 0·75 mm. latis; filamenta ca. 5-seriata, e prope medium tubi adnata, alba, superiora exserta, antheris pollineque luteis; discus e ca. 10 segmentis truncatis, levissime crenulatis, compositus; ovarium ad 0·75 mm. elevatum; stigmata 6, stylum subaequantia, ca. 1 mm. longa; capsula pallide brunnea, infra globose obconica, 12-costata, costis rotundatis, 2 mm. longa, 5 mm., expansa ad 9 mm., diam., supra visa fere circularis, circa marginem leviter concava, medio ad 1·5 mm. conice elevata, valvis expansis demum valde reflexis, pedunculo ample membranaceo alato, alis ad 2 mm. latis.

WILLOWMORE, inter Rietbron et Willowmore, "on Mr. F. Stegman's farm Kruidfontein". *P. A. B. van Breda* 1163. Fl. Maio 1963.

Conophytum steytlervillense Tisch.—The eastern limit of this species, *and* of the genus has been extended by the following collections made by F. J. Stayner in Oct. 1963, on the road between Steytlerville and Port Elizabeth: Karoo Garden 183/63, "25 miles E. of Steytlerville" and 184/63 "18 miles E. of Steytlerville".

The genus **Drosanthemum** Schwant., published in 1927, is firmly based upon Haworth's sections *Aspericaulia* and *Hispicaulia* of **Mesembryanthemum**, published in his "Revisiones Plantarum Succulentarum" in 1821. The former derives its name from the roughness of the internodes and peduncles occurring in most of the species, caused by minute protuberances which look rather like indurated papillae, as opposed to the conspicuous capillary papillae of the *Hispicaulia.* They were both placed in the papulose group (*drosos* = dew) next but one to the section *Barbata* (now **Trichodiadema** and their nearest ally), and the difference in their habit of growth was noted, the *Hispicaulia* being more lowly and less robust than the majority of the *Aspericaulia.* Each section contains a Linnean species: *M. micans* being in *Aspericaulia* and *M. hispidum* in *Hispicaulia.* In all, 20 species were enumerated, 11 in the latter, including *M. pruinosum* which has proved to be a **Delosperma**, and is now regarded as a form with yellow petals of **D. echinatum.** Today about 95 species are recognised, and, to facilitate reference (and incidentally to reduce undue wear and tear of the specimens) until such time as a complete monograph is written, these are roughly arranged in groups and subgroups in the Bolus Herbarium, *Anomalum* being an additional group.

The flowers are solitary throughout the genus except for the 2 or 3 species in the *Aspericaulia* in which they are 3-nate or 2-ternate, as in *D. cymiferum* and *D. worcesterense.* Most of them are mid-day flowers, the largest and most beautiful ones being in the subgroup *Speciosa* where black staminodes occur which have not been recorded for any other genus of the *Mesembrieae.* The nectary varies in gradual stages from the typical form of distinctly separate glands to the completely anular or ring-shaped one that distinguishes the *Anularia*, a subgroup of the *Aspericaulia*, closely allied to the genus **Anisocalyx**.

The genus is widely distributed, ranging from the shores of False and Table Bays to Lüderitz Bay and beyond, as well as inland throughout. Eastwards it occurs in the coastal areas as far as the Uitenhage Division and northwards in the Little Karoo, Great Karoo and Bushmanland.

KEY TO THE GROUPS AND SUBGROUPS.

1. Rootstock with age a large "tuber"; papillae minute, only seen under a lens.—*D. anomalum* (the only species) .. .. .. ANOMALUM
1. Rootstock not "tuberous"; leaves usually conspicuously papillate.
  2. Internodes and peduncles rough or powdery .. .. .. ASPERICAULIA
    3. Nectary anular.—e.g. *D. diversifolium* .. .. ANULARIA
    3. Nectary composed of separate or nearly separate glands.
      4. Usually robust or even rigid shrubs, 20—40 cm. high, or, if slender, of lower growth. Flowers meridian.
        5. Flowers usually more than 3 cm. (smaller in *D. flavum*) in diameter (many of them the finest in the genus) .. SPECIOSA
          5a. Staminodes absent—e.g. *D. flavum.*
          5b. Staminodes white—e.g. *D. bicolor.*
          5c. Staminodes black—e.g. *D. micans.*
        5. Flowers usually 3 cm. or less in diameter (in *D. macrocalyx* up to 4·5 cm. in diameter).
          6. Leaves keeled—e.g. *D. parvifolium* .. .. CARINATA
          6. Leaves dorsally rounded—e.g. *D. ambiguum* .. SEMITERETIA
      4. Shrubs with slender branches, up to 50 cm. high. Flowers pomeridian—e.g. *D. lique* .. .. GRACILIA
  2. Internodes and peduncles hispid with capillary papillae .. .. HISPICAULIA
          7. Staminodes present—e.g. *D. stokoei* .. .. STAMINODIFERA
          7. Staminodes absent—e.g. *D. hispidum* .. .. DEFECTA

Drosanthemum roseatum (N. E. Br.) L. Bol. comb. nov. (*Aspericaulia—Anularia*).—*Mesembryanthemum roseatum* N. E. Br. comb. nov. et nom. nov., Gard. Chron., 87: 32 (1930); *Ruschia comptonii* L. Bol., Mesemb. II: 8 (1928).

The type of this species was described without fruit and was erroneously placed in the genus **Ruschia,** the fruit when known proving to be that of **Drosanthemum.** In combining it with *Mesembryanthemum* as defined by N. E. Brown, this error was repeated, and the new specific name given was required as *M. comptonii* had been previously used.

The following collections have been recorded since the type was published: Vanrhynsdorp Div.; Knersvlakte, Aug. 1929, *Pillans.* Bol. Herb. 27419; ibid. Aug. 1941, *E. Esterhuysen* 7759; Nieuwerust Sept. 1934, *L. Bolus.* Bol. Herb. 21433; Doorn River Bridge, 8 miles S. of Klaver, Aug. 1932, *L. Bolus.* Bol. Herb. 24218; nr. Klaver, Aug. 1945, *L. Bolus.* Bol. Herb. 24219; Lossand, Vredendal, Sept. 1955, *H. Hall.* Bol. Herb. 27420; Vredendal, Oct. 1959, *R. C. Littlewood.* Karoo Garden 586/59; 5 miles N.E. of Kliprand turn-off on the Vanrhynsdorp—Bitterfontein Rd., May 1960, *R. C. Littlewood.* Karoo Garden 279/60.

Drosanthemum inornatum (L. Bol.) L. Bol. comb. nov. (*Aspericaulia—Anularia*).—*Trichodiadema inornatum* L. Bol. Mesemb. II: 8 (1928); *Drosanthemum tardum* L. Bol., l.c.: 183 (1930).

Drosanthemum aureopurpureum L. Bol. (*Aspericaulia—Speciosa*).—*D. micans* (L.) Schwant. var. *aureopurpureum L. Bol. Mesemb.* III: 154.—In recent years we have become much better acquainted with **D. micans** than we were 24 years ago when **D. aureopurpureum** was described as a variety of that species. It is more slender in its habit of growth and diffusely branched, the primary branches up to 2 mm. in diameter and the decumbent flowering branches up to 22 cm. long and 1 mm. in diameter, with internodes up to 5 cm. long; the inner sepals are more conspicuously longer than the outer ones, the petals more obtuse and differently coloured, the nectary glands approximate, the lobes of the ovary reaching the glands and the stigmas more slender and with a much longer cauda, up to 2 mm. long. These differences justify its being elevated now to the rank of a species. A second collection has not been recorded.

Drosanthemum hispidum (L.) Schwant. forma.—A forma typica sepalis intimis quam exterioribus longioribus differt.

MONTAGU; Dobelaar's Kloof, Oct. 1938, *M. R. Levyns* 6668.

In the *Mesembrieae* the outer sepals are nearly always longer than the inner ones. Exception to this rule has been noted in several previous descriptions of species included in the subgroup *Speciosa* of *Aspericaulia*, and this form of **D. hispidum** represents the first instance to be recorded in *Hispicaulia*.

Lampranthus arenicolus L. Bol. sp. nov.—Planta 1 visa, erecta compacta glabra, 34 cm. alta, 39 cm. diam.; apex caulis 2·3 cm. diam.; rami primarii ad 1·3 cm. diam.; ramuli ultimi floriferi graciles, 1 mm. diam., 2—4-foliati, internodiis 5—13 mm. longis; folia ascendentia, supra visa superne convexula, dorso rotundato, lateribus convexis, lat. visa apice saepius uncinate recurvato, 7—10 mm. longa cum vagina persistente 1 mm. longa, 1 mm. lata, 1·5 mm. diam.; flores 3-nati vel ad 3-ternati, ad 1·4 cm. diam.; pedunculi graciles, a receptaculo distincti, saepius 1—2 cm. longi, omnes prope medium bracteati, bracteis foliis similibus, 3—5 mm. longis; receptaculum globose obconicum vel subcyathiforme, prope apicem constrictum, 2—3 mm. longum, apice ad 3·5 mm. diam.; sepala 5, acuta apiculata, omnia ± marginata, 3—4 mm. longa, basi 1·25—2 mm. lata; petala 2—3-seriata, interiora pauca, sublaxa, e medio inferne leviter angustata, obtusa, purpureo rosea, 4—6 mm. longa, ad 1 mm. lata; staminodia ad stamina conice conferta appressa eaque leviter excedentia, inferne dense ciliate papillata pallidaque, superne rosea, massa prope medium leviter constricta; filamenta ca. 4-seriata, inferne pallida, superne rosea, ad 1·75 mm. longa, intima proper apicem dense saturate roseo papillata; discus inconspicuus, profunde divisus; ovarii lobi leviter compressi, vix ad 0·5 mm.

elevati; stigmata 5, anguste subulata, breviter caudata, 1·5 mm. longa; capsula infra cyathiformis, ad 5 mm. longa, ad 6 mm., expansa 10 mm., diam., supra ad 1·5 mm. elevata, suturis leviter compressis, valvis expansis valde reflexis, carinis e basi divergentibus, dimidium valvae attingentibus, exalatis, alis valvae amplis, apicem valvae attingentibus, basi tantum adnatis, aliter liberis, tuberculo minuto vel subnullo, ore loculi in pagina inferiore alae tegentis processibus 2 obconicis aucto.

LAINGSBURG; "in sand, valley at south base of Witteberg range (Laingsburg). Few plants only seen", Nov. 1963, *E. Esterhuysen* 30,524.

Lampranthus vanheerdei L. Bol. sp. nov. (*Scabridi*).—Planta sat gracilis; rami primarii decumbentes subflexuosi brunnei, ad 35 cm. longi, basi 3 mm., apice 1 mm., diam., internodiis 1·5—3 cm. longis; ramuli floriferi erecti, cum floribus ad 20 cm. longi, 1—1·5 mm. diam.; partes herbaceae inconspicue scabridae; folia diu erecta, dorso rotundato, lateribus convexis, supra plana acuta, lat. visa apicem versus non, vel abrupte, angustata, obtusa, glauce viridia, 1—1·6 cm. longa, 1—1·25 mm. lata, ad 2 mm. diam.; flores 3-nati vel 2-ternati; pedunculi gracillimi, a receptaculo distincti, 3—5 cm. longi, omnes parum supra medium bracteati, bracteis 5—6 mm. longis; receptaculum subglobosum vel globose obconicum, 4 mm. longum, 5 mm. diam.; sepala 5, e parum supra basim superne angustata, exteriora subobtusa, intima acute subulata, ample marginata, 3—5 mm. longa, basi 1·5—2 mm. lata; petala exteriora 3-seriata, inferne non, vel leviter, angustata, truncata vel obtusa, roseo purpurea, ad 9 mm. longa, ad 1·25 mm. lata, interiora pauca, intima ad stamina erecta conferta appressa eaque aequantia, acuta, 0·25 mm. lata; staminodia vera nulla; filamenta ca. 4-seriata, alba vel pallide rosea, ad 3·5 mm. longa, intima prope basim dense papillata, antheris pollineque albidis; discus crenulatus; ovarium circa marginem planum, lobis obtuse compressis, demum ad 0·75 mm. elevatis; stigmata 5, anguste subulata, vix ad 2 mm. longa, cauda 0·75 mm. longa; capsula anni prioris infra obconica, 5 mm. longa, 6 mm., expansa 10 mm., diam., suturis leviter compressis, carinis e basi divergentibus, cum alis valvae apicem valvae attingentibus.

NAMAQUALAND; "on the road between Springbok and Spektakel, about 12 miles W. of Springbok," Nov. 1963, *P. van Heerde*. Bolus Herb. 27493.

Opophytum ampliatum L. Bol. sp. nov.—Rami 2 visi, 16—20 cm. longi, teretes, inferne leves politique, superne obscurissime papillati, pallide virides, internodiis ad 5 cm. longis, ad 5 mm. diam.; ramuli ultimi floriferi cum floribus 7—9 cm. longi; folia alterna, fere teretia, obtusa, 3—5 mm. longa, 5—7 mm. diam.; flores singuli; pedunculi 1—1·6 cm. longi; receptaculum globose obconicum, 7—8 mm. longum, ad 10 mm. diam.; calyx minute papillatum, papillis rotundis, ad 2·5 cm. longus, tubo ad 9 mm. longo, segmentis 5, exterioribus 3 teretibus, 1·2—1·6 cm. longis, intimis ovatis, ample pallide marginatis, ad 4 mm. longis; corolla ad 3·5 cm. longa, tubo 7 mm. longo, pallide viridi, segmentis ca. 3-seriatis, albidis, inferne 0·25 mm. latis, superne ampliatis (itaque nomen), apice ad 1 mm. lato, emarginato vel denticulato; staminodia numerosa, mollia sericeaque, interdum subintertexta; filamenta ca. 6-seriata, pallidissime viridia, ad 1·4 cm. longa, antheris pollineque luteis; ovarii lobi leviter compressi, per 3 mm. elevati; stigmata 5, gracilia, e parum supra basim superne angustata, obtusa alba, 1 cm. longa; capsula non visa.

Namaqualand; "in masses between Violsdrift and Steinkopf," Sept.—Oct. 1963, *H. Herre*. S.U.G. 14841.—Mr. Herre writes: "From a distance the masses look like a vleij, as it is one mass of white flowers. One plant covers some square feet."

Ruschia drepanophylla (Schltr. et Bgr.) L. Bol. var. **sneeubergensis** L. Bol. var. nov.—Plantae 3 visae, ferae, erectae compactae, ad 22 cm. altae, ad 21 cm. diam.; caulis ad 1 cm. diam., basi ramos primarios crebros ferens, internodiis 7—20 mm. longis; ramuli novelli roseo purpurei; folia supra plana acuta, lat. visa apice abrupte acuto, lateribus convexis, viridia, levia politaque, ad 1·4 cm. longa, juvenilia conspicue apiculata, reliquiis induratis longe persistentibus; flores 3-nati vel irregulariter biternati, 2—2·5 cm. diam.; pedunculi in receptaculum gradatim transeuntes, ad 1·1 cm. longi, laterales bracteati, bracteis infra medium positis, marginibus membranaceis, 7—10 mm. longis; receptaculum obconicum vel semiglobosum; sepala lineari lanceolata, omnia ± marginata, 5—8 mm., vel 7—8 mm., longa, basi 1·5—3 mm. lata; petala 2-seriata, parum inaequilonga, ex infra medium angustata, apice rotundato, pallide rosea, inferne vittata, superne vitta obscura, 8—11 mm. longa, saepius ad 1·75 mm. lata; staminodia acuminata rosea; staminodia stamina longissima aequantia vel eis breviora, demum recurva; stamina 3—4-seriata, conice collecta, filamentis epapillatis roseis, ad 5 mm. longis, antheris pollineque pallide luteis; discus crenulatus; ovarium vix ad 0·5 mm. elevatum; stigmata 5, gracilia, superne attenuata, sordide saturate purpurea, 4—5 mm. longa cum cauda 0·5 mm. longa; capsula infra obconica, 4—5 mm. longa, ad 6 mm., expansa 10 mm., diam., valvis expansis valde recurvis, non iterum claudentibus sed erectis, carinis divergentibus, parum ultra medium valvae attingentibus, membranis tegentibus dimidium loculi tantum attingentibus, tuberculo inconspicuo, profunde posito.

Clanwilliam; Cederberge, "Sneeuberg area," 4,000 ft., Aug. 1963, *E. Esterhuysen* 30,283.

Ruschia brevifolia L. Bol. sp. nov.—Rami primarii plures visi, erecti virgati rigidi, atrati vel superne saturate brunnei, ad 31 cm. longi, inferne ad 5 mm. diam., internodiis 1—1·5 cm. longis, secondarii fere erecti, ad 25 cm. longi, inferne ramulos steriles breves ferentes, ultimi floriferi 1—5 cm. longi; folia subdifformia, primaria mox decidua, cicatricibus obscurissimis, supra visa subovata subacuta plana, dorso convexo obtuso, 6—7 mm. longa cum vagina 3 mm. longa, basi ad 4 mm. lata., cetera supra visa oblonge ovata, obtusa vel subacuta, carinata, lat. visa subtruncata, vel apice rotundato, 8—10 mm. longa cum vagina 2 mm. longa, medio ad 6 mm. lata, 3—4 mm. diam.; flores marcescentes tantum visi, 1—3-nati; pedunculi 3—5 mm. longi, lateralibus bracteatis, bracteis prope basim positis, 5—7 mm. longis cum vagina ad 3 mm., vel rarius ad 4 mm., longis; receptaculum globose obconicum, 3 mm. longum, ad 5 mm. diam.; sepala 5, omnia ± marginata, 3—4 mm. longa, basi 1·5—2 mm. lata; petala obtusa, purpureo rosea, inferne pallida, ad 8 mm. longa, 0·75 mm. lata; filamenta pallida, antheris pollineque luteis; ovarii lobi obtusissime compressi, demum ad 1 mm. elevati; stigmata 5, inferne gracilia, deinde attenuata, demum caudata, ca. ad 4 mm. longa cum cauda 1 mm. longa; capsula non visa.

NAMAQUALAND; inter Stinkfontein et Modderdrift, Oct. 1963, *H. Herre*. S.U.G. 14838.

The general appearance and the floral structure of this species are in such complete agreement with those of **Ruschia** as to justify its being placed in this genus until fruit revealing a different structure is available. The leaves are among the shortest occurring in **Ruschia.** This genus, like **Conophytum,** is very well represented in Namaqualand (about 66 species having been recorded), and it may prove to be the largest one there, **Conophytum**, which is much more prized and more zealously collected, being the only genus to exceed it.

Sphalmanthus vanheerdei L. Bol. sp. nov. (*Eusphalmanthus*).—Planta 1 visa, glabra erecta, inter rigidissimas in genere notatas, ca. 30 cm. alta; radix lignosa, 8 mm. diam.; caulis 9 mm. diam.; rami primarii stricti pallidi, prope apicem glauce virides, ca. ad 27 cm. longi; partes herbaceae pallide glauce virides, papillatae, papillis rotundis, vix nitentibus; folia primaria alterna, mox marcescentia, basi tantum persistente, semiteretia obtusa, 2·7—3·8 cm. longa, ad 2·5 mm. lata diametroque, axillis saepe gemmiferis, ramulis novellis 4 mm. longis, ad 6-foliatis, foliis ad 2 cm. longis; flores 2—5, laxe dispositi, ramos primarios terminantes; pedunculi in receptaculum gradatim transeuntes, 8—15 mm. longi; calycis tubus ca. 1·5 mm. longus, segmentis 5, e prope medium longe attenuatis, interioribus late marginatis, interdum exteriora leviter excedentibus; corolla ad 1·7 cm. longa, tubo ca. 1 mm. longo, segmentis ca. 4-seriatis, inter angustissima in genere visis, saepius apicem versus angustatis, acutis vel rarius obtusis, inferne albis, superne pulchre roseis, 1—1·6 cm. longis, 0·25—0·75 mm. latis; staminodia nulla; filamenta ca. 6-seriata, alba, ad 7 mm. longa, antheris pollineque albidis; ovarium ad 1·5 mm. elevatum; stigmata 5, gracillima alba, 6—7 mm. longa.

NAMAQUALAND; "koppie, 15 miles from Springbok on the road to Spektakel," Nov. 1963, *P. van Heerde*. Bolus Herb. 27494. "The whole side of the koppie was covered with the flowers, which were a beautiful sight just before sunset." (*van Heerde.*)

Sphalmanthus leipoldtii L. Bol. sp. nov.—Planta 1 visa glabra; radix crassa, 2 cm. diam.; rami primarii decumbentes, cum floribus ad 18 cm. longi inferne defoliati, internodiis 7—20 mm. longis, 1—2 mm. diam.; partes herbaceae inconspicue papillatae, papillis rotundis; folia alterna, patentia vel decurva, supra visa plana lineari lanceolata, obtusa, dorso convexulo, basi amplectentia, ad 4 cm. longa, 5 mm. lata, 1—1·5 mm. diam.; flores in cymam 2—3-ramosam irregulariter dispositi, cymis compactis vel laxissimis adque 12 cm. diam.; pedunculi a calyce distincti, 1—2 cm. longi; flores ad 3 cm. diam.; receptaculum globose obconicum, 4 mm. longum, ad 6 mm. diam.; calycis tubus 2 mm. longis, segmentis 5, valde inaequilongis, extimis 2 cum interiore 1 superne angustatis, convexulis, obtusis vel subacutis, saepius ad 1·4 cm. longis, intimis ad 8 mm. longis, superne acute subulatis, ample marginatis; segmenta corollae ca. 4-seriata, inferne leviter angustata, obtusa vel emarginata, rosea, ad 1·5 cm. longa, ad 1·25 mm. lata; staminodia pallide rosea, ad 8 mm. longa; filamenta ca. 6-seriata, alba, ad 5 mm. longa, antheris pollineque luteis; fossae glandula ornatae; stigmata 5, 2 mm. longa; ovarium circa marginem concavum, medio ad 1 mm. elevatum.

CALVINIA, inter Oorlog's Kloof et Papkuilsfontein, Sept. 1939, *C. L. Leipoldt* 4483.

Sphalmanthus subpetiolatus (L. Bol.) L. Bol. comb. nov.—*Aridaria subpetiolata* L. Bol., Mesemb. II: 476.

Sphalmanthus resurgens (Kensit) L. Bol. comb. nov.—*Phyllobolus resurgens* (Kensit) Schwant., Gfl. (1928) 68; *P. resurgens* (Kensit) N. E. Br., Gard. Chron. 84: 253; *Aridaria resurgens* (Kensit) L. Bol., S.A. Gard. 18: 127 and Mesemb. I: 66; *M. resurgens* Kensit, Trans. Roy. Soc. S.A. 1: 154 (1910).

The genus **Phyllobolus** N. E. Br. was established in 1925, its brief description appearing in a key with no mention of a type-species (Gard. Chron. 78: ii, 253). In 1926 this description was amplified and *P. Pearsonii N. E. Br.* (name only) given as a representative species, with its synonym *M. Pearsonii* N. E. Br. (Phillips, Gen. S. Afr. Fl. Pl. 246). In 1928 (Gard. Chron. 84: 253) this species was not included in the three that were enumerated as constituting this genus: "*P. Lesliei*, N. E. Br., will be described later but differs from *P. resurgens* by its longer pedicels and larger flowers; *P. pubicalyx*, N. E. Br., calyx pubescent; *P. resurgens*, N. E. Br. (*M. resurgens* Kensit. Aridaria resurgens L. Bol.)." Of these the first two were never described and are therefore insufficiently known. In the case of *P. pearsonii* N. E. Br. some error seems to have occurred. For *M. pearsonii* N. E. Br., published in 1912 (Kew Bull. p. 277 and Bot. Mag.

t. 8463), is an **Argyroderma,** which in 1922 was reduced to **A. testiculare** (Haw.) N. E. Br. var. **pearsonii** N. E. Br. (Gard. Chron. 71: 92), and in 1929 was published as **A. pearsonii** (N. E. Br.) Schwant. (Monatschr. Deutsch. Kakt.—Ges. 1.28.).

In 1962 (Journ. S.A. Bot. 288–289) the genus **Aridaria** N. E. Br. was restricted to the type, **A. noctiflora** (L.) N. E. Br. and the rest of Haworth's § *Noctiflora*, and the remaining species constituting Haworth's sections *Trichotoma* and *Digitiflora* were proposed as subgenera of **Sphalmanthus.** As the floral structure and alternate leaves of **Phyllobolus** are completely in accord with those of typical **Sphalmanthus,** it may also be included as a subgenus. For a large "tuberous" rootstock and an abbreviated fleshy stem with deciduous shoots also occur, although in a lesser degree, in **Sphalmanthus** [as in **S. subpetiolatus** (L. Bol.) L. Bol., for example], and the only constant differentiating characters known are the enclosed internodes of the short unbranched annual shoots and the solitary usually nearly sessile flower terminating them. With the addition of **Phyllobolus** as a subgenus the four divisions of the genus are the *Eusphalmanthi* and the subgenera *Digitiflori, Trichotomi* and *Phylloboli.*

Sphalmanthus micans L. Bol. sp. nov. (*Phylloboli*).—Ad **S. resurgentem** L. Bol. valde affinis, sed partibus herbaceis micante papillatis, papillis prominentibus, saepe acutis, calycis segmentis omnibus ex infra medium digitiforme elongatis, praecipue differt.

Planta "ca. ad 20 cm. diam., ortus ca. 20 ferens" (*H. Hall*); folia supra visa subacuta vel obtusa, lat. visa superne vix angustata, obtusa viridia, 4·5—7 cm. longa, 1·5—3 mm. diam.; pedunculi culti 1—1·8 cm. longi; receptaculum semiglobosum, ad 7 mm. longum, ad 1 cm. diam.; calycis tubus 3 mm. longus, segmentis 5, 1·3—1·4 cm., vel 1·4—1·8 cm., longis, basi 4—5 mm. latis, interioribus inferne ample marginatis; corolla ad 2·7 cm. longa, tubo 4 mm. longo, segmentis ca. 4-seriatis, obtusis vel acutis, pallide viridi luteis, 0·5—1·5 mm. latis; staminodia subnulla; filamenta ca. 8-seriata, pallida, antheris pollineque pallidissime lutea; ovarium acute lobatum, per 1·5 mm., vel demum ad 2 mm., elevatum; stigmata gracilia pallida, 3—4 mm. longa.

CALVINIA; Glen Lyon, prope Nieuwoudtville, Oct. 1960, *A. J. Middlemost*, N.B.G. 731/60. Fl. Jun. 1963.

This species and **S. resurgens** have been growing side by side at Kirstenbosch for 3 years, and Mr. Hall has kindly supplied the following notes: "The diameter of the largest plant collected was about 20 cm. This had approximately 20 individual growing points, these being level with the surface of the ground. The large fleshy rootstock tapers symmetrically into a well-defined tap root. This species differs from **S. resurgens** in having more prominent papillae, a larger and more symmetrical rootstock, and in retaining its dried growths for a much longer period during the dormant season."

Note.—The type specimens of all new species described in this paper are in the Bolus Herbarium, University of Cape Town, Rondebosch.

(*To be continued.*)

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THE LOST TYPE SPECIES OF ELYTROPAPPUS CASS.

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(*Smuts Memorial Fellow* 1962/64)

The type of the genus *Elytropappus* Cass. is *Elytropappus hispidus* (L.f.) Druce. The younger Linnaeus described it as *Gnaphalium hispidum* L.f. from a Thunberg specimen collected in "Bockland" (cf. Levyns 1935, 1939). In her revision of the genus, Levyns (1935 p. 90) notes, that the species "has not been collected since its discovery by Thunberg", and it is generally regarded as one of Thunberg's "lost species".

In 1917 Hutchinson described a plant from the Giftberg as *Ifloga setulosa* Hutch. This was collected by Phillips on the Percy Sladen Memorial Expedition in 1911. An examination of the type material reveals, that the plant is in reality a species of *Elytropappus* and no doubt identical to the long-lost *E. hispidus* (L.f.) Druce.

We know from Thunberg's travels that his "Bockland" is part of the Bokkeveld Mountains escarpment near the valley of the Doorn River, that has its sources in the Hantam Mountains (not to be confused with the Doorn River south of the Giftberg). It also appears that Thunberg must have collected the plant in November 1774 (cf. Karsten 1939, p. 147).

The Giftberg and the Bokkeveld Mountains mentioned are geologically and ecologically very similar and the distance between the two localities may be estimated at about 40 miles.

Elytropappus hispidus (L.f.) Druce and *E. cyathiformis* DC. constitute "Section I" of the genus in Levyns' revision (Levyns 1935). This section is characterized by the capitula being massed together in terminal rounded clusters. The cm.-long distinctly setose leaves of *E. hispidus* (L.f.) Druce readily serve to distinguish this species from *E. cyathiformis* DC. The leaves of the latter are about half the length and often glandular but not hispid or setose. The distribution of the two species is shown in Map 1 based on the material in BOL, NBG and SAM. A comparison with Weimarck's distribution map of *E. cyathiformis* DC. (Weimarck 1941, map 231) shows that in the last decades a rich material of this species has been accumulated (see Appendix).

A description and drawings of *E. hispidus* (L.f.) Druce are given below based on Phillips' specimens (the type material of *Ifloga setulosa* Hutch.).

Elytropappus hispidus (L.f.) Druce in Rep. Bot. Exch. Cl. Brit. Isles, 1916, p. 621 (1917).
Gnaphalium hispidum L.f., Suppl., p. 363 (1781).
Elytropappus spinellosus Cass., Bull. Soc. Philom., p. 199 (1816).
E. spinulosus Less., Syn. Comp., p. 343 (1832).
Metalasia hispida Don, Mem. Wern. Soc., V, p. 557 (1826).
Ifloga setulosa Hutch., Ann. S. Afr. Mus., IX, p. 372 (1917).

A branched *shrub*, thinly cobwebby or woolly esp. on the younger branches. *Leaves* erecto-patent, linear-filiform, subterete, 8—15 mm. long, c. 1 mm. thick, mucronate, normally twisted; upper surface narrow, woolly; lower surface larger, glabrescent, setose with $\frac{3}{4}$—1 mm. long spreading hairs. *Capitula* 5—7 mm. long, 3—4 mm. in diam., massed 6—10 together in terminal rounded clusters. *Involucral bracts* imbricate, scarious, acuminate, often with pink or reddish tips; outer shorter and laxly woolly at the back; inner glabrous and with denticulate-fimbrillate margins near the tips. *Florets* 6—8. *Corolla* tubular, c. 4 mm. long; corolla lobes with thickened margins and scattered hairs on the outsides. *Anthers* 2·5 mm. long incl. appendage and tails. Appendage lanceolate, 0·5 mm. long. Tails filiform, somewhat lacerate, 0·5 mm. long. *Style* branches 1 mm. long, with truncate penicillate tips. *Ovary* glabrous, transversely wrinkled. *Pappus* bristles c. 15, erect, densely plumose, white. Outer *pappus* a short cup-shaped annulus.

HOLOTYPE. Bockland, *Thunberg* (UPS, *non vidi*).

APPENDIX: MATERIAL EXAMINED

Elytropappus hispidus (L.f.) Druce.
VAN RHYNSDORP. Giftberg, 1,000—2,000 ft., 18.ix.1911, *E. P. Phillips* 7438 (BOL, SAM).

Elytropappus cyathiformis DC.

LAINGSBURG. Witteberg, Bantams, 5,000 ft., 27.x.1941, *Compton* 12139 (NBG).

WORCESTER. De Straat, 3,000 ft., 26.ix.1936, *Compton* 6476 (BOL, NBG).

CERES. Elands Kloof, 4,000 ft., iv.1935, *Levyns* (BOL); 15.xii.1935, *Levyns* 5111 (BOL, SAM); 29.ix.1944, *Compton* 16170 (NBG). Roodeberg, 6,000 ft., i.1940, *Esterhuysen* 1514 (BOL); 27.xii.1952, *Esterhuysen* 20923 (BOL). Conical Peak, xii.1940, *Stokoe* (SAM). Baviaansberg, 5,300 ft., 2.i.1942, *Compton* 12857 (NBG). De Keur, 11.xi.1946, *Compton* 18789 (NBG); *Leighton* 2886 (BOL). Gydoberg, 10.xi.1946, *Leighton* 2231 (BOL). Schurweberg, 3,000 ft., 11.x.1952, *Esterhuysen* 20638 (BOL). Visgat, between Schurfteberg and Gt. Winterhoek Mts., x.1953, *Stokoe* (SAM). Kleinveld, 1.x.1958, *Esterhuysen* 27916 (BOL).

CLANWILLIAM. Tafelberg, 5,500 ft., 22.i.1897, *Schlechter* 10103 (BOL). Elands Kloof, 26.iv.1936, *Lewis* (BOL); 3.x.1940, *Compton* 9675 (NBG); *Esterhuysen* 3281 (BOL); 3,000 ft., 17.xi.1941, *Compton* 12482 (NBG). Sneeuwkop, 5,500 ft., 12.ii.1936, *Compton* 6162 (NBG). Wabooms River, 3,000 ft., 25.xi.1936, *Compton* 6477 (NBG). Between Groot Rivier and Elands Kloof, x.1939, *Leipoldt* 3264 (BOL). Langberg, 5,500 ft., 15.xii.1941, *Compton* 12756 (NBG), *Esterhuysen* 7302 (BOL, SAM).E. side of Sneeuwberg, 4,500 ft., 10.x.1946, *Esterhuysen* 13086 (BOL.)

PIKETBERG. Twenty Four River Mts. above Porterville, 22.x.1949, *Esterhuysen* 16110 (BOL).

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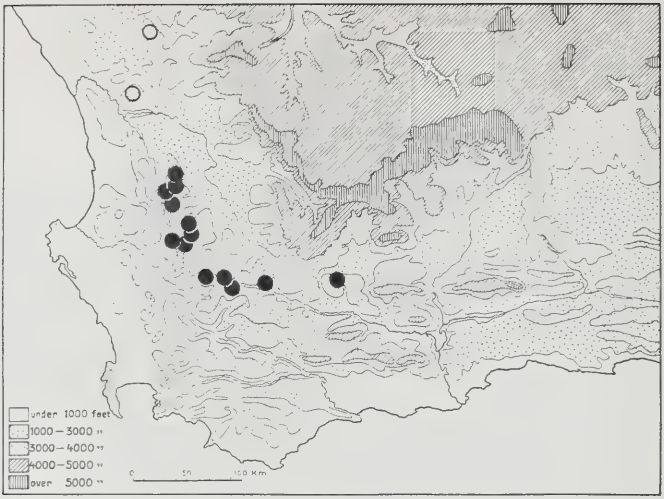

Map 1. The distribution of *Elytropappus hispidus* (L.f.) Druce (open rings) and *E. cyathiformis* DC. (dots).

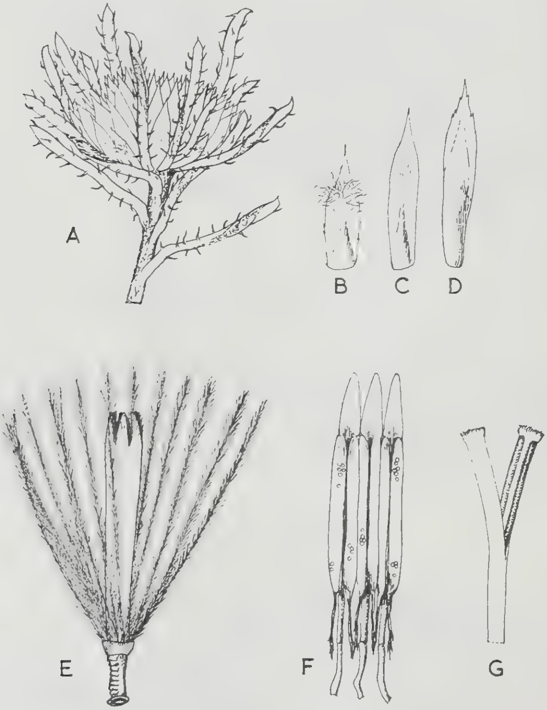

Fig. 1. *Elytropappus hispidus* (L.f.) Druce—*Phillips* 7438. A Branch tip with cluster of capitula, ×2. B–D Outer, middle and inner involucral bracts, ×5. E Floret, ×10. F Anthers, ×20. G Style branches, ×20—Del. auct.

A NEW SPECIES OF ERIOCEPHALUS

R. B. Nordenstam

(*Smuts Memorial Fellow* 1962/64)

Eriocephalus macroglossus B. Nord. sp. nov.

Frutices robusti ramosi cortice incano, rami floriferi breviter villosi. *Folia* linearia vel linearo-filiformia, simplicia vel interdum trilobata, dense argenteo-sericea, alternata vel fasciculata, basibus nonnihil dilatis. *Pedunculi* villosi in subumbellis terminalibus dispositi. *Involucri bracteae* 4, ovatae, plerumque obtusae, marginibus apicibusque fuscis vel subnigris. *Bracteae flosculorum radii* ad medium vel ultra connatae, quot flosculi radii, submembranaceae, tomentosae. *Flosculi radii* 2—3, quidque lamina magna lactea; ovarium dense tomentosum. *Bracteae flosculorum disci* ovatae—lanceolatae, membranaceae, tomentosae. *Flosculi disci* 8—12, corolla tubulata; ovarium cylindricum, glabrum, sterile.

Vigorous much-branched *shrubs*, 0·5—1·2 m. high. Old stems and branches nude, with grey cortex. Floriferous branches erect, straight, shortly villous. *Leaves* linear or linear-filiform, semiterete or flattened, 0·3—2 cm. long, mostly simple but sometimes 3-lobed, alternate or seemingly fascicled on brachyblasts (on the flowering shoots mostly simple and alternate), densely and adpressedly silvery-sericeous, acute or subacute. *Leaf-base* somewhat dilated, situated on a cushion-like projection from the main axis. *Peduncles* 4—10, arranged in terminal subumbels, 4—8 mm. long, densely villous. *Involucral bracts* 4, ovate, 4—5 mm. long, 2·5—4 mm. wide, herbaceous or somewhat coriaceous towards the base, obtuse or seldom acute, brown or blackish towards the margins and tips, with tomentose margins and outsides; the two outer ones more keeled and narrow, the two inner ones somewhat broader and flatter. *Bracts of ray-florets* 2—3, connate to the middle or slightly more, broadly ovate, 6—7 mm. long, submembranous, with tomentose margins and outsides; tomentum growing copiously after the anthesis, white or fulvous to brownish. *Ray-florets* 2—3. *Limb* broadly oblong or oblong-cuneate, 6—7 mm. long, 4—6 mm. wide, many-nerved, cream-coloured, bluntly 3-toothed at the apex. *Tube* narrowly cylindrical, 2—3 mm. long, brownish, striate. *Style* terete; lobes flat, linear, tapering towards the tips, 2·5—4 mm. long. *Ovary* (and achene) narrowly oblong, 2—3 mm. long, somewhat flattened, densely tomentose. *Bracts of disc-florets* ovate—narrowly oblong or lanceolate (the inner ones narrower), 6—7 mm. long, 1·5—3 mm. wide, membranous, acute, with woolly margins and backs. *Disc-florets* 8—12. *Corolla* tubular, gradually widening above, 3·5—4 mm. long; lobes triangular, 0·5 mm. long, acute. *Anthers* 1·2—2 mm. long incl. the ovate appendage. *Style* terete, simple, with a somewhat convex tip surrounded by short hairs. *Ovary* cylindrical, 1—1·5 mm. long, glabrous, sterile.

HOLOTYPE. *B. Maguire* 374 in Compton Herbarium, National Botanic Gardens, Kirstenbosch.

Flowering period: July—September.

L. NAMAQUALAND. Prope Kasteel Poort, Aug. 1883, *Bolus* 9569 (BOL); Richtersveld, Kubus, main kloof, Aug. 1925, *Marloth* 12367 b (BOL); Ezelsfontein, Sept. 1950, *Maguire* 379 (NBG); 6 miles W. of Springbok, Sept. 1950, *Maguire* 374 (NBG holotype); 14 miles W. by S. of Springbok, July 1957, *Acocks* 19332 (BOL); Same locality, Sept. 1957, *Acocks* 19572 (BOL,NBG); 10 miles W. of Springbok on Spektakel road, Nov. 1962, *Nordenstam* 1877 (LD); Ezelsfontein, 14 miles W. of Springbok, Nov. 1962, *Nordenstam* 1883 (LD).

Eriocephalus macroglossus is characterized, i.a., by the silvery leaves, subumbellate inflorescence, short and villous peduncles, large heads and rays, and the copious tomentum in the capitula. The new species comes nearest to *E. scariosus* DC. and *E. africanus* L. From the former species it is readily distinguished by the concentrated terminal inflorescence and the absence of broad white membranous margins of the involucral bracts. From the polymorphic *E. africanus* it differs chiefly by its larger capitula and rays, and longer, more copious wool.

The leaves of *E. macroglossus* are usually all entire, but in the collection from the Richtersveld several leaves are three-lobed (see fig.). This is a character of little importance in the genus, as pointed out by Levyns (1941 p. 135).

E. macroglossus is hitherto only known from northern Namaqualand. It grows in stony or rocky ground and on small kopjes (shale and quartzite) in a small area west of Springbok, and has also been found once in the Richtersveld. The locality "Kasteel Poort" could not be traced and is thus not indicated on the distribution map.

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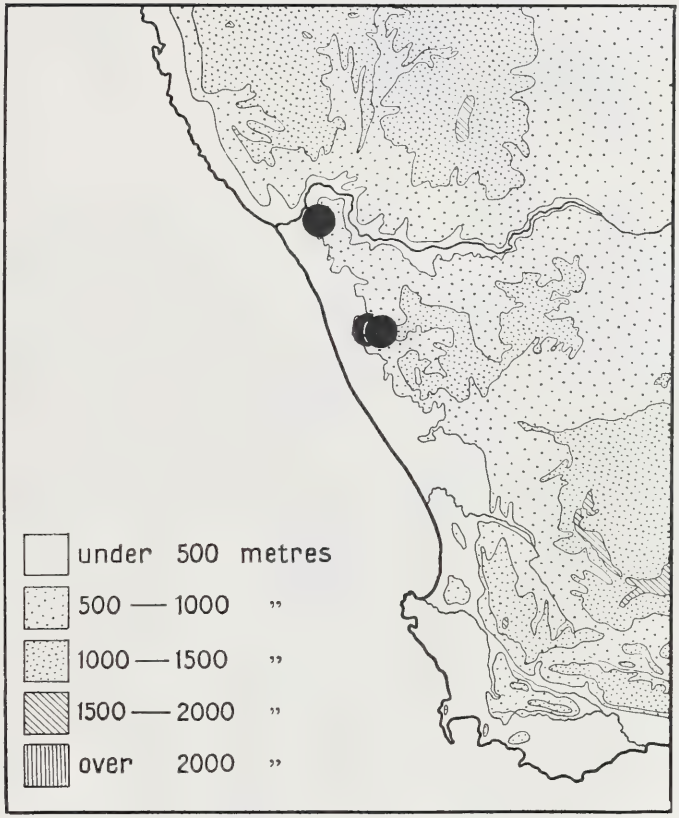


MAP 1. The distribution of *Eriocephalus macroglossus* B. Nord.

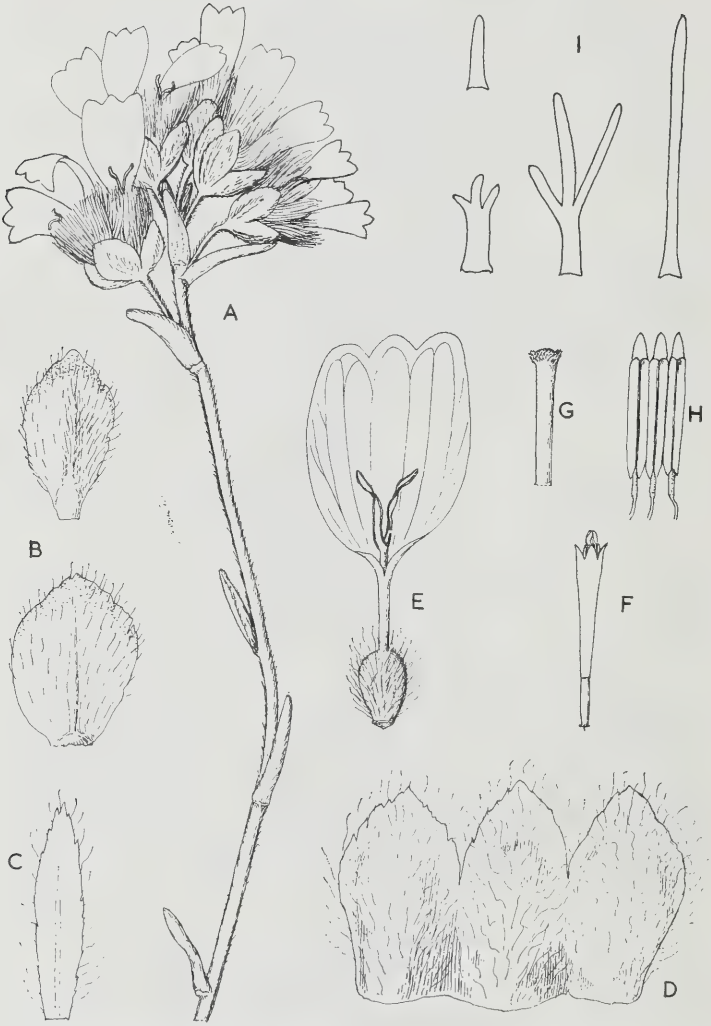


FIG. 1. *Eriocephalus macroglossus* B. Nord. A Portion of plant ×2. B Involucral bracts ×5. C Bract of disc-floret ×5. D Bracts of ray-florets ×5. E Ray-floret ×5. F Disc-floret ×5. G Style of disc-floret ×10. H Anthers ×10. I Outline of leaves, all from the same branch ×2 (A–H *Maguire* 374, I *Marloth* 12367 b.) *Del.* R. B. Nordenstam.

COMPTONANTHUS, A NEW GENUS OF THE COMPOSITAE WITH NOTES ON LASIOPOGON IN SOUTH AFRICA

R. B. Nordenstam

(*Smuts Memorial Fellow* 1962/64)

The generic limits within the subtribe *Gnaphaliinae* of the *Compositae-Inuleae* are often somewhat vague, especially in the group of genera related to the *Gnaphalium-Helichrysum* complex. The distinction between *Gnaphalium* and *Helichrysum* is a completely arbitrary one, but the two genera are generally upheld "for practical reasons" (cf. Hedberg 1957, p. 336, Levyns 1941, p. 84). Also, the genera *Leontonyx* and *Stenocline* are poorly defined against the *Gnaphalium-Helichrysum* complex (cf. Moeser 1909, p. 442, Merxmüller 1954, p. 434). Future monographers will have to decide upon the seemingly inevitable reclassifications. The proportion of the female florets to the perfect ones appears to be a quite useless character for generic distinctions in this group. The morphology of the pappus offers more reliable and constant characters. Thus, *Helipterum* is defined against *Helichrysum* by the plumose pappus, and the same character serves to distinguish *Lasiopogon* from the *Gnaphalium-Helichrysum* complex. The new genus *Comptonanthus*, described in this paper, is also mainly characterized by the pappus morphology. Two of the species of *Comptonanthus* have been known as *Lasiopogon* species, and the third one has remained undescribed until now. *Lasiopogon*, in the writer's opinion, comprises only two species, which will be dealt with in some detail in this paper.

In *Lasiopogon* the pappus bristles are amply feathered from the base with long and thin lateral branches. In sharp contrast to this pappus type stands the serrate, serrulate or barbellate pappus type of the *Gnaphalium-Helichrysum* complex, i.e., pappus bristles with very short lateral branches. In *Comptonanthus* the pappus bristles are smooth in the lower half (normally with a few delicate spreading basal hairs) and feathered in the upper half only. The lateral branches of the bristles are shorter and thicker than in *Lasiopogon* and have obtuse or rounded tips. It should be noted that a similar pappus type occurs in the genus *Ifloga*, under which name species of *Comptonanthus* are sometimes found in herbaria. However, these two genera are easily distinguished, since in *Ifloga* the marginal florets are subtended by paleae and lack a pappus.

An account of the new genus *Comptonanthus* is given below, with drawings and distribution maps, as well as some notes on the related genus *Lasiopogon* in South Africa. Part of the material in the following herbaria has been consulted (abbreviations in accordance with Lanjouw and Stafleu 1956), BOL, LD, M, NBG, PRE, SAM. The species of *Comptonanthus* were found under various generic names, viz., *Lasiopogon*, *Gnaphalium*, *Helichrysum*, *Leontonyx*, *Ifloga* (and *Trichogyne*), and among *Compositae incertae*.

Comptonanthus B. Nord. (*Compositae-Inuleae-Gnaphaliinae*) Gen. nov. affinis *Lasiopogon* Cass., sed pappo plumoso tantum in dimidio superiore, ramis minoribus crassioribus, apicibus obtuso-rotundatis, et capitulis minus condensatis in acervis globosis, tomento minus pleno.

Herbae annuae parvae. *Folia* alternata, integra, glabrata vel tomentosa, sessilia. *Capitula* parva, heterogama. *Involucri bracteae* 1—3-seriatae, marginibus apicibusque membranaceis vel scariosis. *Receptaculum* nudum, breve faveolatum. *Floruli marginales* feminei; corolla filiformis, glabra, apice minute dentata. Rami styli lineares, complanati, truncati. *Pappus* et *achaenia* consimiles eis florulorum hermaphroditorum. *Floruli disci* hermaphroditi; corolla cylindrica, 5-lobata, glabra. Antherae caudatae, appendiculis ovatis. Rami styli lineares, complanati, truncati. *Achaenia* teretia, glabra, laevigata sed minute papillosa vel glandulosa. *Pappi* setae uniseriatae, paucae, caducae, in dimidio superiore plumosae.

Small annual *herbs*, usually many-stemmed from the base and ± decumbent, sometimes few-stemmed or simple and ± erect, glabrate or tomentose. *Leaves* alternate, sessile, flat or flattened, entire. *Peduncles* short or O. *Capitula* small, campanulate or oblong or rounded, heterogamous, with filiform marginal female florets and tubular central perfect florets, the numerical proportions between the two kinds varying, arranged terminally in condensed clusters or sometimes more laxly disposed in elongated inflorescences, seldom solitary. *Involucral bracts* 1—3-seriate, outer bracts shorter, with membranous or scarious margins and tips, glabrous or tomentose. *Receptacle* nude, shallowly honey-combed, glabrous. *Female florets* 5—20. *Corolla* filiform, glabrous, minutely toothed or lobed at the apex. *Style* terete; branches linear, flattened, truncate, exserted or included. *Pappus* and *achenes* as in the perfect florets. *Perfect florets* few—many (up to c. 20). *Corolla* tubular, gradually widening above, glabrous, regularly 5-lobed. *Anthers* with an ovate obtuse appendage and filiform tails. *Style* terete with linear, flattened, truncate branches. *Achenes* terete, (narrowly) oblong—obovate, smooth or minutely papillate or glandular. *Pappus* bristles uniseriate, few (up to 10), caducous, erect, whitish, near the base with a few delicate spreading hairs, otherwise smooth in the lower half, in the upper half plumose with somewhat thickened obtuse branches.

Type Species: *C. molluginoides* (DC.) B. Nord. comb. nov. Species 3, native of South and South West Africa.

Key to the species of *Comptonanthus*.

1. Leaves mucronate. Involucral bracts acute—acuminate 1. *C. molluginoides*
1. Leaves obtuse, not mucronate. Involucral bracts obtuse—truncate.
  2. White-woolly. Leaves herbaceous. Perfect florets few (1–5, seldom up to 10), purple-tipped 2. *C. brachypterus*
  2. Glabrate or thinly tomentose. Leaves somewhat fleshy. Perfect florets 10—20, about equalling the female florets in number 3. *C. subcarnosus*

1. **Comptonanthus molluginoides** (DC.) B. Nord. comb. nov.
Lasiopogon molluginoides DC., Prodr. 6, p. 246 (1837).
L. micropoides DC. var. β.; Harvey in Fl. Cap. 3, p. 264 (1865).
Helichrysum scleranthoides S. Moore in Bull. Herb. Boiss., Sér. II, 4, p. 1016 (1904).

Annuals, branching from the base. *Stems* spreading on the ground, prostrate or decumbent, seldom suberect, up to 10 cm. long, laxly leafy or nude below, ending in condensed or elongated leafy inflorescences, loosely white- or grey-woolly, sometimes glabrate. *Leaves* linear—oblong, 2—7 mm. long, 0·3—1 mm. wide, flattened, herbaceous, loosely tomentose esp. on the adaxial side, sometimes glabrescent, distinctly mucronate. Leaf-margins often somewhat involute. *Capitula* cylindrical or narrowly campanulate, 2—3 mm. long, 1—2 mm. wide, fasicled in terminal rounded clusters surrounded by leaves, or more loosely grouped together in elongated inflorescences, sometimes solitary in leaf fascicles along the stems, sessile or shortly peduncled. *Involucral bracts* 10—15, 2—3-seriate, linear—lanceolate or narrowly oblong-ovate, 2—3 mm. long, 0·4—0·8 (—1) mm. wide (outer bracts distinctly shorter, often only $\frac{1}{2}$ the length), membranous, somewhat keeled and gibbous towards the base, pellucid or whitish—light brownish, glabrous, acute—acuminate. *Receptacle* ± flat, shallowly honey-combed. *Female florets* 5—10. *Corolla* tubular-filiform, slightly narrowed towards both ends, 1·5 mm. long, minutely 3—4-lobed at the apex. *Achenes* and *pappus* as in the perfect florets. *Perfect florets* 5—10. *Corolla* tubular, slightly widening above, c. 1·8 mm. long, sometimes purple-tipped. *Style* branches 0·2—0·3 mm. long, truncate. *Anthers* c. 1 mm. long incl. the ovate obtuse appendage and the filiform tails. *Achenes* narrowly obovate-oblong, 0·6—0·7 mm. long, glabrous, minutely papillate, yellowish or light brownish. *Pappus* bristles 7—10, c. 1·8 mm. long, basally with some delicate and spreading hairs, otherwise smooth in the lower half, distinctly plumose in the upper half.

Type. L. NAMAQUALAND, near Verleptpram, *Drège* (G-DC, *non vidi*).

Flowering Period. Flowering specimens seen from most months, apparently flowering shortly after good rains.

PRIESKA. 8 miles E. of Marydale on road to Prieska, 28.viii.1963, *Hardy* and *Rauh* 1565 (PRE).

HAY. 9.vii.1936, *Acocks* 508 (BOL,M,PRE); Lelyksstad, bank of Orange River, 19.vi.1938, *Acocks* 5746 (BOL).

KENHARDT. Jagbult, 9.v.1946, *Acocks* 12627 (PRE); Kakamas, Letterkop, 12.vii.1946, *Wasserfall* 1096 (PRE); 2 miles W. of Kenhardt, 29.ix.1952, *Acocks* 16996 (PRE); Aughrabies, 21.viii.1954, *Compton* 24469 (NBG).

L. NAMAQUALAND. Keuzabies, 18.v.1898, *M. Schlechter* 79 (BOL,PRE); N. of Annisfontein, ix.-x.1926, *Pillans* 5299 (BOL); 2 miles S. of Goodhouse, vii.1950, *Lewis* (SAM); 14 miles S. of Goodhouse, vii. 1950, *Lewis* (SAM); Goodhouse, 27.vii.1950, *Barker* 6261 (NBG); Near Ratelkraal, 7.ix.1950, *Compton* 22007 (NBG); 0·7 miles NE. of Oghrabies Poort, 29.x.1962, *Nordenstam* 1646 (LD); Holgat, ravine N. of the road, 30.x.1962, *Nordenstam* 1648 (LD); Richtersveld, 9 miles N. of Annisfontein, 2.xi.1962, *Nordenstam* 1729 (LD); Richtersveld, sandveld NW. of Dolomite Peaks, 5.xi.1962, *Nordenstam* 1793 (LD).

GORDONIA. Kalahari Gemsbok Park, 43 miles NNE. of Twee Rivieren, 16.iv.1960, *Leistner* 1830 (PRE); Kuruman River, 16 miles W. of Kuruman-Gordonia boundary, 18.x.1961, *Leistner* 2895 (M,PRE).

SOUTH WEST AFRICA. Kanibis-Aiais, lower Fish River, viii.1909, *Marloth* 3743 (PRE); Kanibis River, 20.ix.1909, *Range* 734 (SAM); Klein-Karas, x.1913, *Dinter* 3221 (SAM); Hoolog, bed of Great Fish River, 22.i.1916, *Pearson* 9803 (BOL); Aus, 16.vi.1922, *Dinter* 3655 (BOL,PRE,SAM); Buntfeldschuh, 7.ix.1922, *Dinter* 3767 (BOL,PRE,SAM); Klein-Karas, 4.viii.1923, *Dinter* 4743 (BOL,PRE,SAM); 5 km. E. of Buchuberge, 2.vii.1929, *Dinter* 6442 (BOL,M, PRE,SAM); Klein Karas, Groendoorn, 6.vi.1931, *Oertendahl* 676 (BOL,PRE); 15 miles N. of Grünau, 25.iv.1949, *Wilman* 295 (BOL); Near Ausweiche, Farm Klein Aus, 25.vi.1949, *Kinges* 2260 (M,PRE); Farm Weissenborn, 3.viii.1949, *Kinges* 2356 (M,PRE); 35 miles S. by W. of Narubis, 30.iv.1955, *Acocks* 18043 (PRE); 29 miles ESE. of Keetmanshoop on road to Narubis, 15.v.1955, *de Winter* 3551 (PRE); Haribes, 1956, *Volk* 12199 (M); Great Tigerberg, 1.viii.1950, *Kinges* 2644 (M); Farm Augustfelde, 10 miles NE. of Aus, 4.viii.1959, *Giess* and *v. Vuuren* 607 (M,PRE); Farm Klein Aus, 11.viii.1959, *Giess* and *v. Vuuren* 775 (BOL,M,PRE); 11 miles W. of Aus, 15.iv.1963, *Nordenstam* 2237 (LD); 2 miles N. of Aus, 17.iv.1963, *Nordenstam* 2259 (LD); Grootfonteiner Fläche W. of Maltahöhe, 15.viii.1963, *Merxmüller* and *Giess* 2803 (M); Namibfläche between Neisip and Eureka, 16.viii.1963, *Merxmüller* and *Giess* 2872 (M); Farm Swartpunt, 26.viii.1963, *Merxmüller* and *Giess* 3163 (M); 13 miles N. of Sendelingsdrift, 28.viii.1963, *Merxmüller* and *Giess* 3235 (M).

DOUBTFUL LOCALITY. LAINGSBURG. Near Ketting Station, 19.ix.1953, *Acocks* 17127 (PRE).

It is difficult to understand why Harvey (1865) included *Lasiopogon molluginoides* DC. as a variety under *L. micropoides* DC. The two species are easily separable even without examination of the pappus, and they are here put into different genera. There is little doubt, that *Helichrysum scleranthoides* S. Moore is a synonym to *Comptonanthus molluginoides*, although the present writer has not been able to examine the type material (*Dinter* 1242 and 1244 from Gubub, South West Africa).

Comptonanthus molluginoides is the longest known and most common species of the genus, and it is here chosen as the generic type. It occurs in South West Africa, Little Namaqualand, and Bushmanland, i.e., on both sides of the Orange River, as far inland as Prieska and Hay. The species prefers open sandy soil, where there is little competition from other vegetation.

Comptonanthus molluginoides is easily recognized by its narrow and mucronate leaves, and its acute or acuminate involucral bracts. In the arrangement of the capitula there is quite a variation from condensed rounded clusters, approaching the condition in *Lasiopogon*, to rather laxly fascicled or even solitary capitula along elongated flowering stems. The number of perfect florets sometimes exceeds the number of female florets, but the reverse condition is normally prevalent.

2. **Comptonanthus brachypterus** (O. Hoffm. ex Zahlbr.) B. Nord. comb. nov.
Lasiopogon brachypterus O. Hoffm. ex Zahlbruckner in Ann. Nat. Hofmus. Wien, xx, p. 57 (1905).

Erect or suberect white-woolly *annuals*, 1—5 cm. high, simple or little-branched below, often nearly stemless, seldom many-stemmed from the base and somewhat prostrate. *Leaves* linear—oblanceolate, 3—7 mm. long, 1 mm. wide or less, obtuse—subacute, herbaceous. Uppermost leaves often shorter and broader, spatulate—narrowly obovate, obtuse. *Capitula* small, 1·3—2 mm. long and wide, loosely grouped together apically on short lateral branches, surrounded by leaves, sometimes subsessile and more condensed to clusters, but normally easily separable. *Involucral bracts* subuniseriate and subequal (sometimes a few shorter outer involucral bracts present), 10—13, linear, 1·3—2 mm. long, 0·2 mm. wide or less, with a coriaceous median portion and membranous—scarious margins, woolly for their greater length, with a glabrous, membranous, light brown, truncate or somewhat emarginate tip. *Receptacle* ± flat, shallowly honey-combed, glabrous. *Female florets* 10—20. *Corolla* filiform, c. 1 mm. long, purplish or red towards the tip. *Style* branches c. 0.1 mm. long. *Achenes* and *pappus* as in the perfect florets. *Perfect florets* few, 1—5 (seldom up to 10). *Corolla* tubular, slightly widening above, c. 1 mm. long, with red or purplish lobes. *Anthers* 0·4 mm. long incl. tails and the ovate obtuse appendage.

Style branches 0·2 mm. long, truncate. *Achenes* oblong, terete, 0·4 mm. long, glabrous, smooth, light brown.

TYPE. Sir Lowry's Pass—Palmietrivier, *Penther* 1145 (W, *non vidi*).

FLOWERING PERIOD. Mainly September—December.

PENINSULA. Over Woodhead Tunnel, 26.x.1897, *Wolley Dod* 3341 (BOL); Table Mountain, x.1918, *Pillans* 3208 (PRE); Klaver Valley, Simonstown, 10.xi.1933, *Salter* 3968 (BOL); Vlakkenberg, 17.x.1947, *Compton* 20178 (NBG); W. end of Table Mountain, 18.xi.1951, *Esterhuysen* 19242 (BOL,NBG,PRE); Table Mountain, Hout Bay Corner, 19.x.1952, *Esterhuysen* 20678 (BOL,PRE).

CALEDON. Steenbras River, 13.x.1894, *Schlechter* 5394 (BOL,SAM).

PAARL. Upper Witte River Valley, 27.ix.1953, *Esterhuysen* 21787 (BOL, PRE).

WORCESTER. Witteberg, Slanghoek Mountains, 13.xi.1949, *Esterhuysen* 16500 (BOL).

CERES. W. foot of Matroosberg, 27.xii.1952, *Esterhuysen* 20942 (BOL).

CLANWILLIAM. Krakadouw Peak, x.1936, *Thorne* (SAM); Cedarberg, Middleberg, 25.ix.1937, *Compton* 7065 (NBG); Algeria Forest Station, iii.1940, *Stokoe* (SAM); N. Cedarbergen, along path from Pakhuis to Heuningvlei, 19.x.1945, *Esterhuysen* 12062 (BOL); N. Cedarbergen, Koupoort, 22.x.1945, *Esterhuysen* 12141 (BOL); S. Cedarbergen, Sneeuwberg, 11.xii.1950, *Esterhuysen* 18082 (BOL); Wolfberg, 3.x.1952, *Esterhuysen* 20576 (BOL,PRE).

PIKETBERG. Kapiteins Kloof Mountain, 21.x.1935, *Pillans* 7990 (BOL); Twenty Four Rivers Mountains above Porterville, 23.x.1949, *Esterhuysen* 16187 (BOL).

VANRHYNSDORP. Giftberg, 13.x.1953, *Esterhuysen* 22008 (BOL,PRE), *Esterhuysen* 22039 (BOL,PRE).

L. NAMAQUALAND. Khamiesberg, Sneeuwkop, 14.x.1928, *Hutchinson* 880 (BOL).

This species is probably more common than the distribution map indicates. From the records available it has a western Cape distribution, from the Peninsula and Caledon Divisions northwards to the Giftberg, and there is one record from the Khamiesberg. The last-mentioned interval may prove to be real, but in many other areas the diminutive species has certainly been overlooked by collectors. Although the species is not a typical member of the fynbos vegetation, the distribution suggests a phytogeographical affinity to the Cape element.

Comptonanthus brachypterus occurs in disturbed or open soil, preferably in sandy and often damp patches, along streams, on rock ledges, and in shallow rock pans. The species prefers higher altitudes, being found up to 5,000 feet in the Cedarbergen. In the southern part of its distribution area, e.g., on the Peninsula, it sometimes occurs below 1,000 feet.

Comptonanthus brachypterus is a small annual, sometimes very dwarfish and nearly stemless. The white pubescence and the small flowerheads with the red- or purple-tipped florets are characteristic features, serving to distinguish the species from its congeners.

3. **Comptonanthus subcarnosus** B. Nord. sp. nov.

Plantae annuae ramis multis e basi, decumbentes vel interdum suberectae, glabratae vel tenuiter araneoso-villosae. *Folia* alternata, linearia—oblanceolata vel anguste oblongo-obovata apicem versus latiores, subcarnosa, obtusa, glabrata vel tenuiter araneosa. *Capitula* fasciculata, subsessilia vel breviter pedunculata. *Involucri bracteae* 2—3-seriatae; exteriores breviores, membranaceae, obtusae; interiores lineares, cum parti coriaceo basale, apicibus truncato-rotundatis saepe emarginatis. *Floruli feminei* 10—20 filiformes. *Floruli hermaphroditi* 10—20 cylindrici. *Pappi* setae 5—8, caducae, in dimidio superiore plumosae. *Achaenia* teretia, anguste oblonga, minute glandulosa.

Annuals with many stems from the base, decumbent—suberect, 1—8 cm. high, laxly leafy, glabrate or thinly cobwebby-tomentose esp. on the younger branches. *Leaves* alternate, linear—oblanceolate—narrowly oblong-obovate (the uppermost shorter, often obovate), 3—7 mm. long, 1—2 mm. wide, broadest near the tip, tapering to the base, somewhat fleshy, glabrate or thinly cobwebby-tomentose, obtuse. *Capitula* oblong or rounded, 2—3 mm. long, c. 2 mm. wide, arranged in terminal clusters surrounded by leaves, subsessile or shortly peduncled. *Involucral bracts* 15—20, 2—3-seriate, linear—narrowly oblong, 2—3 mm. long, 0·3—0·8(—1) mm. wide, glabrous, membranous, pellucid, whitish or greenish, with a coriaceous median portion in the lower half, with truncate—rounded often emarginate tips; outer shorter, membranous throughout, obtuse. *Female florets* 10—20. *Corolla* filiform, 1·5 mm. long, minutely 3—5-toothed at the apex. *Style* branches $\frac{1}{4}$ mm. long, truncate. *Achenes* and *pappus* as in the perfect florets. *Perfect florets* 10—20. *Corolla* tubular below, widening above, c. 1·8 mm. long. *Style* branches linear, $\frac{1}{4}$ mm. long, truncate. *Anthers* c. 0·8 mm. long incl. appendage and tails. *Achenes* narrowly oblong, terete, c. 0·4 mm. long, minutely glandular, brownish. *Pappus* bristles 5—8, 1·5—1·8 mm. long, smooth in the lower half, plumose in the upper half.

HOLOTYPE. VANRHYNSDORP, Holriver, *Nordenstam* 894 (LD).

FLOWERING PERIOD. July—October.

CERES. Ceres Karoo, 20.ix.1931, *Compton* 3786 (BOL); Ceres Karoo, 1.x.1932, *Compton* 4077 (BOL); Gansfontein, 26.viii.1935, *Compton* 5471 (NBG); Brewelsfontein Karoo Farm, 21.ix.1941, *Compton* 11819 (NBG).

VANRHYNSDORP. Knechts Vlagte, 16.vii.1896, *Schlechter* 8158 (BOL); Zout River Bridge between Vanrhynsdorp and Nieuwerust, 19.ix.1931, *Salter* 1388 (SAM); Knechts Vlakte, 21.ix.1933, *Salter* 3841 (BOL); Knersvlakte, Soutrivier, ix.1941, *Stokoe* (SAM); Knechts Vlakte, 3.ix.1948, *Compton* 20872 (NBG); 4 miles N. of Holriver Bridge, 10.viii.1962, *Nordenstam* 894 (LD,UPS).

Comptonanthus subcarnosus is less pubescent than its congeners, being often glabrate or nearly glabrous. The lack of indumentum is compensated by another xerophytic feature: the leaves are somewhat carnose. The species probably has a rather limited distribution. Hitherto it is known from Ceres Karoo and from Kners Vlakte. In the type locality it grows in sandy patches of quartzite formations.

On some herbarium sheets was suggested that *Gnaphalium prostratum* Thunb. might be the same species. From a comparison between Thunberg's type and some of the present author's specimens (kindly performed by Mr. N. Lundqvist, Uppsala), it is evident that this is not the case. The two species differ, i.a., in the important pappus characters, *Gnaphalium prostratum* having the serrate pappus type typical of the *Gnaphalium-Helichrysum* complex.

Notes on *Lasiopogon* Cass. in South Africa

Since the genus *Comptonanthus* is easily confused with *Lasiopogon* a brief account of the latter genus in South Africa is given below. In habit the species of the two genera are often rather similar and also resemble some annual species of *Helichrysum* and *Gnaphalium* and the monotypic genus *Eriosphaera.* Examination of the pappus is necessary for a correct determination of a specimen. *Lasiopogon* comprises annuals with heterogamous heads and pappus bristles that are amply feathered from the base.

De Candolle (1837) recognized three species of *Lasiopogon.* Of these *L. molluginoides* was later sunk under *L. micropoides* by Harvey (1865), but in the present paper it is revived to specific level and transferred to *Comptonanthus.* Also the later described *L. brachypterus* falls under *Comptonanthus.* Thus there are only two species of *Lasiopogon,* both of which occur in South Africa.

Key to species of *Lasiopogon.*

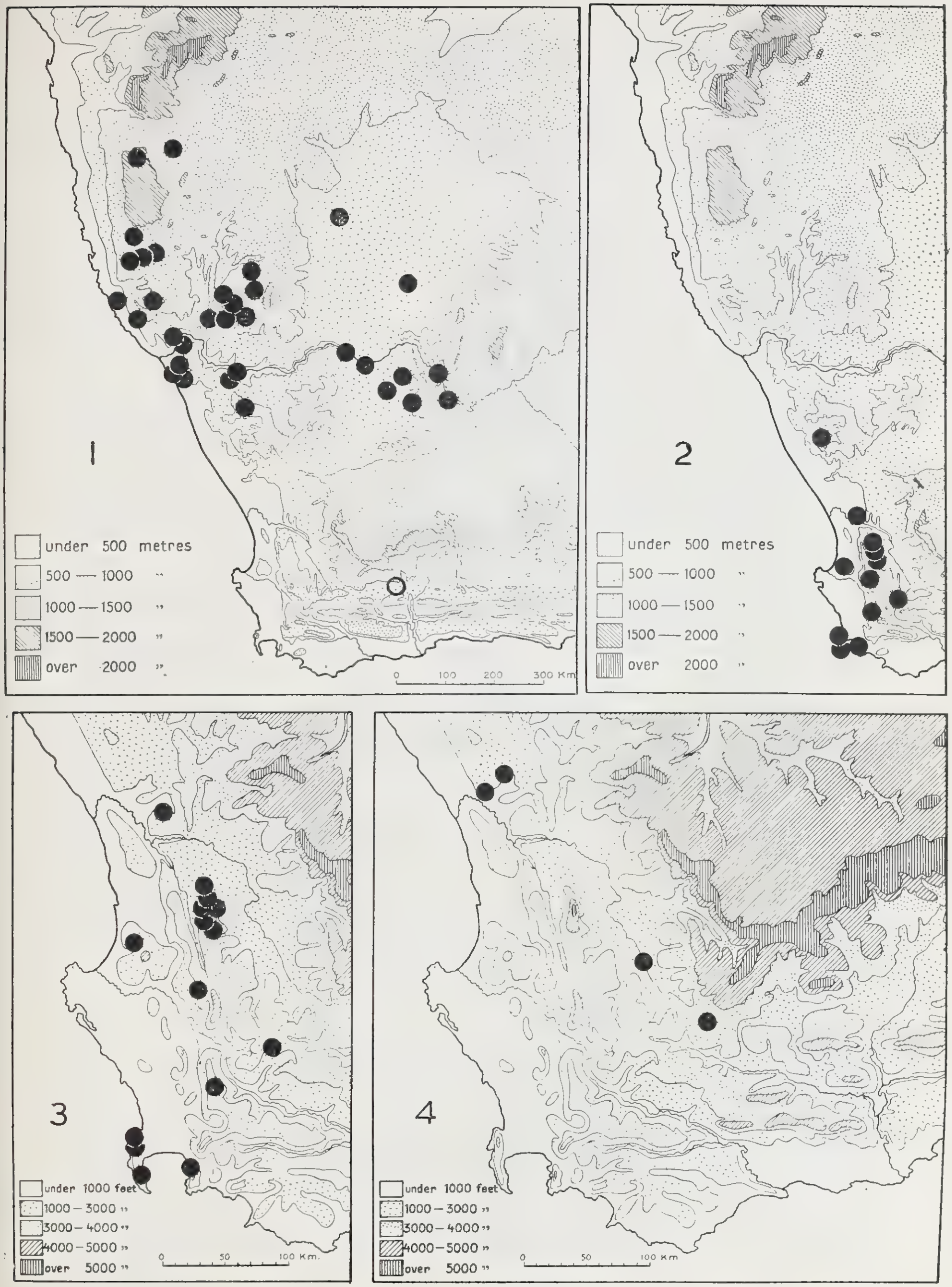
1. Female florets more numerous than the few (2—7) perfect florets. Pappus bristles with long and thin lateral branches throughout 1. *L. muscoides*

1. Perfect florets many (20–30), usually exceeding the female florets in number. Pappus tips with shorter and slightly thickened lateral branches. 2. *L. micropoides*

1. **Lasiopogon muscoides** (Desf.) DC.

De Candolle, Prodr. 6, p. 246 (1837); Harvey in Fl. Cap. 3, p. 265 (1865).
Gnaphalium muscoides Desf., Fl. Atlant. 2, p. 267 (1799).
Lasiopogon lanatum Cass., Bull. Philom. 1818, p. 75 (1818).

Prostrate or decumbent *annuals,* copiously greyish- or brownish-woolly. *Leaves* spatulate or obovate—oblanceolate, obtuse. *Capitula* in dense rounded woolly clusters. *Involucral bracts* linear—narrowly oblong; margins and tips membranous, whitish or brownish; tips truncate or rounded, often emarginate



MAP 1. *Comptonanthus molluginoides*. O: doubtful locality. MAP 2. *C. brachypterus*. MAP 3. *C. brachypterus*, distribution in more detail (the Khamiesberg locality not included). MAP 4. *C. subcarnosus*.

or minutely toothed. *Female florets* numerous (20—40). *Corolla* filiform, c. 2 mm. long, minutely toothed at the apex. *Style* branches exserted, linear, c. 0·3 mm. long. *Perfect florets* few (2—7). *Corolla* tubular, slightly widening above, c. 2 mm. long. *Style* branches ¼ mm. long, truncate. *Anthers* c. 1 mm. long incl. appendage and tails. *Achenes* narrowly elliptic-oblong, 0·5 mm. long, glandular-papillate. *Pappus* bristles c. 10, 2 mm. long, finely plumose from the base; lateral branches thin, c. 1 mm. long.

FLOWERING PERIOD. Varying.

KOMGHA. *Flanagan* (NBG, p.p. *Gnaphalium glomerulatum* Sond.).

PEDDIE. Line Drift, xii.1900, *Galpin* 3974 leg. *Sim* (BOL).

ALBERT. Ventersstad, vii.1918, *B. Rogers*, herb. Bolus. 15563 (BOL).

LAINGSBURG. Baviaans River bed, Whitehill, 8.viii.1927, *Compton* 3269 (BOL); Whitehill, 18.viii.1941, *Compton* 11253 p.p. (NBG, most specimens are *Gnaphalium glomerulatum* Sond.).

CALVINIA. 28 miles N. of Calvinia, 25.ix.1952, *Maguire* 1953 (NBG); 20 miles NW. of Calvinia on Loeriesfontein road, 14.ix.1961, *Barker* 9496 (NBG).

L. NAMAQUALAND. Prope Port Nolloth, viii.1883, Herb. Norm. Austr. Afr. 425 leg. *Bolus* (BOL,SAM).

HERBERT. St. Clair, ix.1897, *Orpen* p.p. (SAM, p.p. *Gnaphalium glomerulatum* Sond.).

KURUMAN. Cotton End, vii.1940, *Forsyth* (BOL).

BECHUANALAND PROTECTORATE. Batlharos, xi.1920, *Silke*, herb. Bolus. 16579 (BOL).

SOUTH WEST AFRICA. Nautzerus, 1.viii.1949, *Strey* 2619 p.p. (M,SAM, p.p. *Leontonyx* sp.); Lekkerwater, 32 miles E. of Aranos, 26.iv.1960, *Giess* and *v. Vuuren* 1093 (M); Farm Swartpunt, 26.viii.1963, *Merxmüller* and *Giess* 3166 c (M).

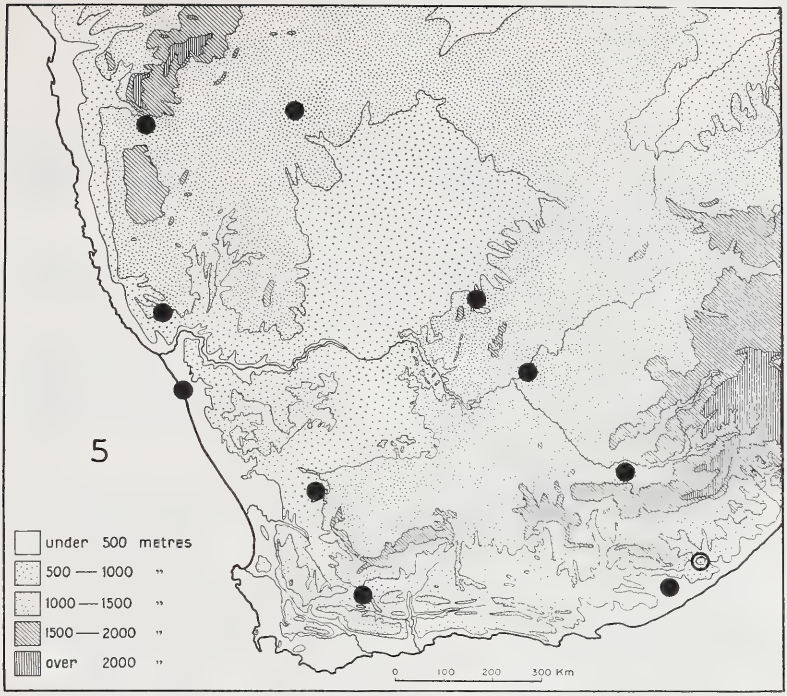
Lasiopogon muscoides is the type of the genus (Phillips 1951). The species is widely distributed throughout Africa, in southern Europe, and southern Asia as far east as India. Only South African localities are listed here.

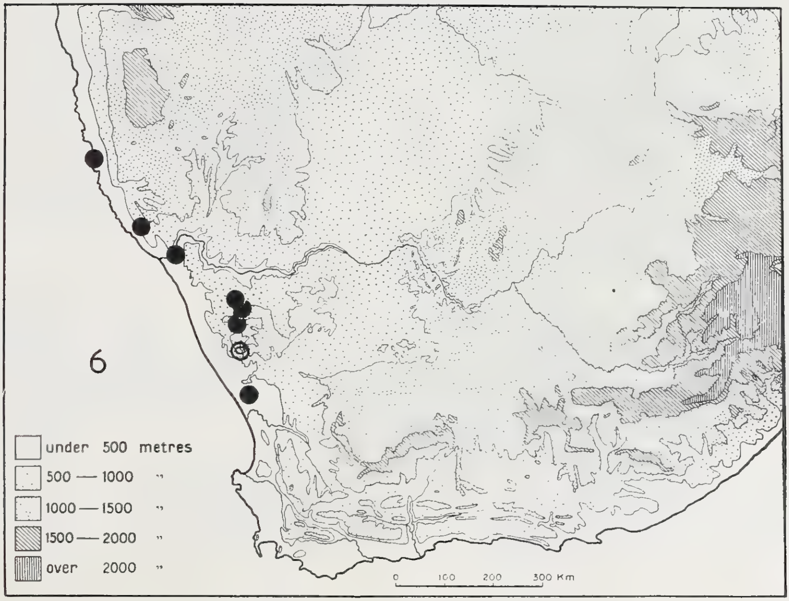
2. **Lasiopogon micropoides** DC.

De Candolle, Prodr. 6, p. 246 (1837).

L. micropoides DC. var. α; Harvey in Fl. Cap. 3, p. 264 (1865).

Usually many-stemmed decumbent or prostrate *annuals*, copiously and loosely greyish- or brownish-woolly. *Leaves* obovate—spatulate, obtuse. *Capitula* in dense rounded woolly clusters. *Involucral bracts* linear; tips truncate or rounded, membranous, whitish. *Female florets* c. 10—20. *Corolla* filiform, c. 2 mm. long, minutely toothed at the apex. *Style* branches exserted, 0·3 mm. long, truncate. *Perfect florets* c. 20—30. *Corolla* tubular, widening above, 2—2·2 mm. long. *Style* branches c. ¼ mm. long, truncate. *Anthers* c. 1 mm. long





MAP 5. *Lasiopogon muscoides* in South Africa. MAP 6. *L. micropoides*. O: inexact locality.

incl. appendage and tails. *Achenes* narrowly elliptic-oblong, c. 0·5 mm. long, glandular-papillate. *Pappus* bristles 5—10, finely plumose from the base, c. 2 mm. long; lower lateral branches c. 1 mm. long or slightly more, apical branches shorter and somewhat thickened.

Flowering Period. June—October.

VANRHYNSDORP. Kareebergen, 17.vii.1896, *Schlechter* 8169 (BOL).

L. NAMAQUALAND. Between Zilverfontein, Kooperbergen and Kaus, ix.,x., *Drège* (SAM); Concordia, 19.ix.1897, *Schlechter* 11321 (BOL); Zabies, 16.vi.1898, *M. Schlechter* 96 (BOL); Garies and Khamies Kroon, viii.1929, *L. Bolus* (BOL); Mesklip, 24.viii.1941, *Esterhuysen* 5837, 5959 (BOL); 2 miles NE. of Springbok, 8.ix.1950, *Compton* 22048 (NBG); 7½ miles NE. of Steinkopf, 25.vii.1957, *Acocks* 19382 (M); 1 mile E. of Arrisdrift, 31.x.1962, *Nordenstam* 1689 (LD).

SOUTH WEST AFRICA. Lüderitzbucht, ix., *Range* 1121 (SAM); 5 km. E. of Buchuberge, 2.vii.1929, *Dinter* 6433 (BOL); Hills to Nautilus, Lüderitz, 16.vii.1950, *Kinges* 2635 (M); Lüderitzbucht, 28.v.1956, *Volk* 12833 (M); 1 mile S. of Lagoon, Lüderitz, 5.viii.1959, *Giess* and *v. Vuuren* 654 (BOL,M).

Lasiopogon micropoides is in habit often indistinguishable from *L. muscoides*. The most reliable distinction is provided by the proportion of the two kinds of florets, and there is also a difference in the tips of the pappus bristles (cf. fig. 1).

L. micropoides, contrary to the other species, is endemic to South Africa. It has a rather limited distribution in Vanrhynsdorp and L. Namaqualand Divisions and also occurs in southern South West Africa.

ACKNOWLEDGEMENTS

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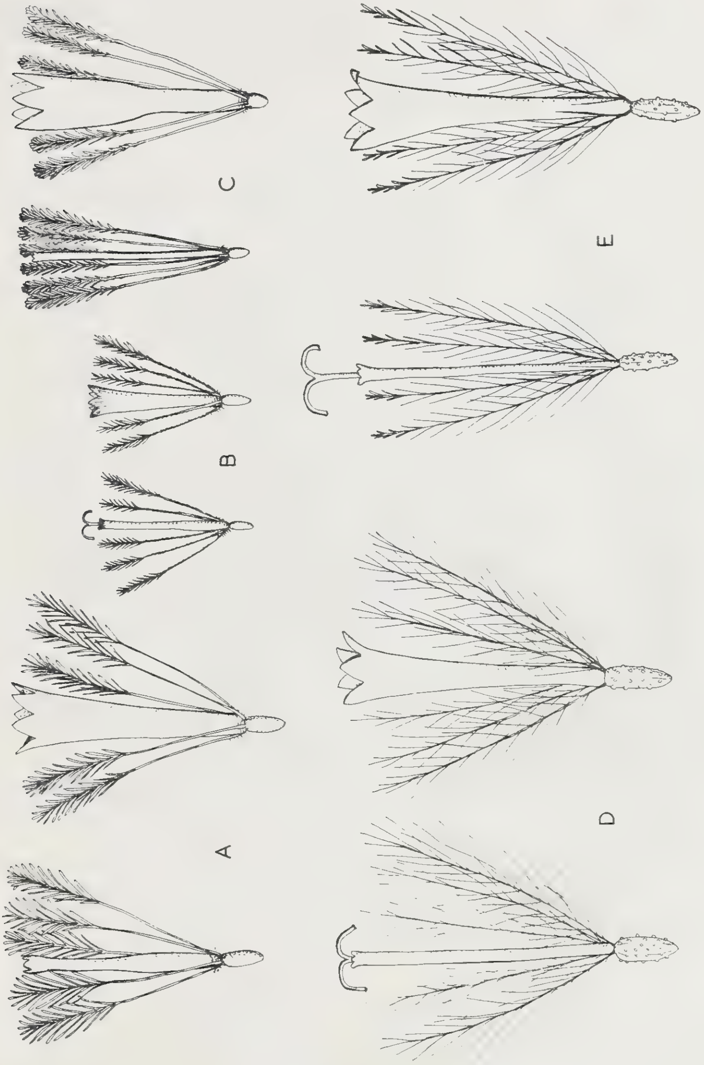

FIG. 1. Female (left) and perfect (right) florets, all × 20. A *Comptonanthus mollugìnoides* (*Barker* 6261). B *C. brachypterus* (*Esterhuysen* 19242). C *C. subcarnosus* (*Nordenstam* 894). D *Lasiopogon muscoides* (*Barker* 9496). E *L. micropoides* (*Compton* 22048). *Del.* R. B. Nordenstam.

A NEW ALOE FROM TANGANYIKA

G. W. Reynolds

(With Plates XII and XIII)

Aloe richardsiae Reynolds. Species nova, affinis *A. bullockii* Reynolds, foliis 10—15 mm. latis, racemis multo laxoribus triplo longioribus, bracteisque triplo longioribus differt.

Planta bulbo subterraneo 35 mm. longo, 30 mm. diam., radicibus crassis anguste attenuatis. *Folia* 8—10, rosulata, patula, 20—25 cm. longa, 10—15 mm. lata; *supra* canaliculata, viridula, obscure lineata; *subtus* convexa viridula, immaculata; marginibus dentibus cartilagineis albidis, ½ mm. longis, 1—2 mm. distantibus ciliata.

Inflorescentia simplex, 35—45 cm. alta. *Pedunculus* basi plano-convexus et 8 mm. latus. *Racemus* anguste cylindrico-acuminatus, 25 cm. longus, 5—6 cm. diam. *Bracteae* anguste ovato-acutae, 25—30 mm. longae, 7—8 mm. latae, albidae, scariosae, plurinervatae. *Pedicelli* 5—7 mm. longi. *Perianthium* pallide aurantiaco-coccineum, gracilis, usque 48 mm. longum, circa ovarium 7—8 mm. diam., hinc levissime constrictum et decurvum; *segmenta exteriora* per 15 mm. libera. *Antherae* 1—2 mm. exsertae. *Stigma* demum 2—3 mm. exsertum. *Ovarium* 5 mm. longum, 3 mm. diametro. (Plates XII; XIII).

Tanganyika: Iringa District, Ipogoro-M'kawa track, Sao Hill, c. 3,500 ft., 12 December 1961, Mrs. H. M. Richards 15604, holotype (K), isotype (PRE)—"Grass clearing in woodland, wet mud, dry in dry season. Growing in many thousands, a wonderful sight. Leaves narrow, flowers vermilion, tip yellow. Roots bulbous"; Cultivated Mbabane Swaziland, fl. 5 Oct. 1963, Richards et Reynolds 9971 (K); fl. 17 Nov. 1963, Richards et Reynolds 10003 (PRE).

Our very distinctive new species is named after Mrs. H. M. Richards who is one of the most outstanding collectors there has ever been in Tropical Africa. She started collecting in 1951 (at an age when most men had already retired), and in the following 12 years has collected over 18,000 gatherings, many from places hitherto unknown botanically, mostly in the backwoods of Northern Rhodesia and Tanganyika.

Mrs. Richards and Mr. John Proctor discovered considerable numbers of plants of *A. richardsiae* flowering in December 1961 in a very out of the way place, namely along the Ipogoro-M'kawa track. From a carefully prepared map by Mr. Proctor the Aloe area lies about 12 miles south-west of Madibira Mission, beyond the Ndembera River, and north-east of Ipogoro, at approximately 8° 16′ S., 34° 44′ E., which is about 50 miles due west of Sao Hill as the crow flies, at 3,500 ft. Mr. Proctor noticed plants in an area about 5 miles long and 2 miles wide.

Mrs. Richards and Mr. Proctor revisited the locality in December 1962 and sent several plants to me and these have grown well in Mbabane, Swaziland. When two of these plants flowered in October and November 1963, photographs were at last secured and the description could be completed.

A. richardsiae is distinguished by having an underground bulb-like swelling and is closely related to *A. bullockii* Reynolds from the Kahama District in North-western Tanganyika—*vide* this *Journal* 27: 73, pl. 11, 12 (1961), but it differs in having much narrower more fleshy leaves (10—15 mm. broad against 30 mm.), a very laxly flowered raceme that is three times as long (25—30 cm. against 7—10 cm.) considerably longer bracts (25—30 mm. long against 8—10 mm.) and longer flowers. The bulb-like swelling in *A. richardsiae* is much more pronounced when flowering in the rainy season than it is in the dry months.

DESCRIPTION

Plant with thick fleshy narrowly long-attenuate (not fusiform) roots, and with an underground bulb-like swelling about 35 mm. long, 30 mm. diam.

Leaves 8—10, rosulate, rather fleshy, suberectly to obliquely spreading, 20—25 cm. long, 15 mm. broad when pressed flat; *upper surface* canaliculate, green, obscurely lineate, unspotted; *lower surface* convex, lineate, without spots; margins ciliate with white cartilaginous deltoid crowded teeth that are $\frac{1}{2}$ mm. long, 1—2 mm. distant.

Inflorescence simple, 35—45 cm. tall.

Peduncle brown, basally plano-convex, 8—9 mm. broad, with a few scattered sterile bracts the lowest up to 5 cm. long, 8 mm. broad, gradually attenuate long-pointed, many-nerved.

Raceme narrowly cylindric-acuminate, very laxly flowered, about 25 cm. long, 5—6 cm. diam., the youngest buds at first hidden by long imbricate bracts, the lowest open flowers pendulous.

Bracts narrowly ovate-acute, 25—30 mm. long, 7—8 mm. broad, thin, white, scarious, many-nerved.

Pedicels 5—7 mm. long, nutant at apex.

Perianth pale orange-scarlet, up to 48 mm. long, 7—8 mm. diam. across the ovary, slightly narrowed above the ovary, thence slightly decurved and slightly enlarging to the throat and narrowing again to a laterally compressed rather

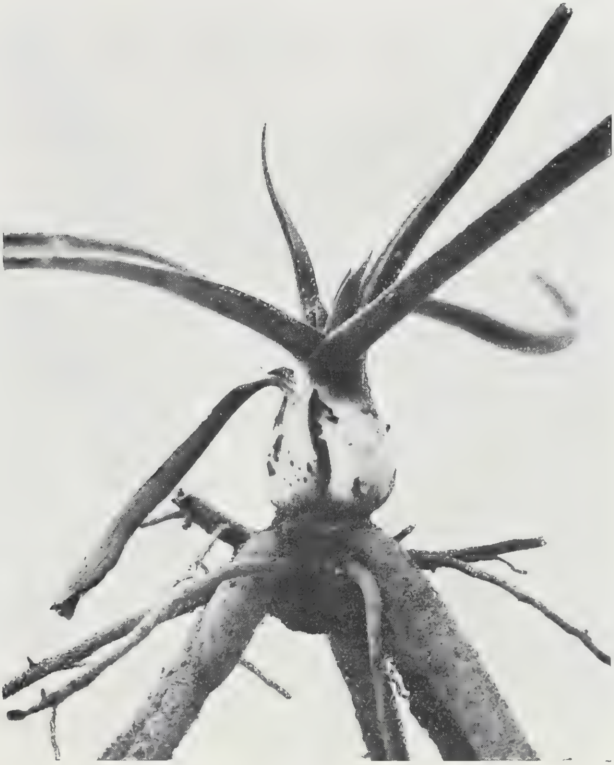

Plate XII

Aloe richardsiae Reynolds Plant x 2/3, showing underground bulbous swelling, and thick tapering—*not* fusiform—roots.

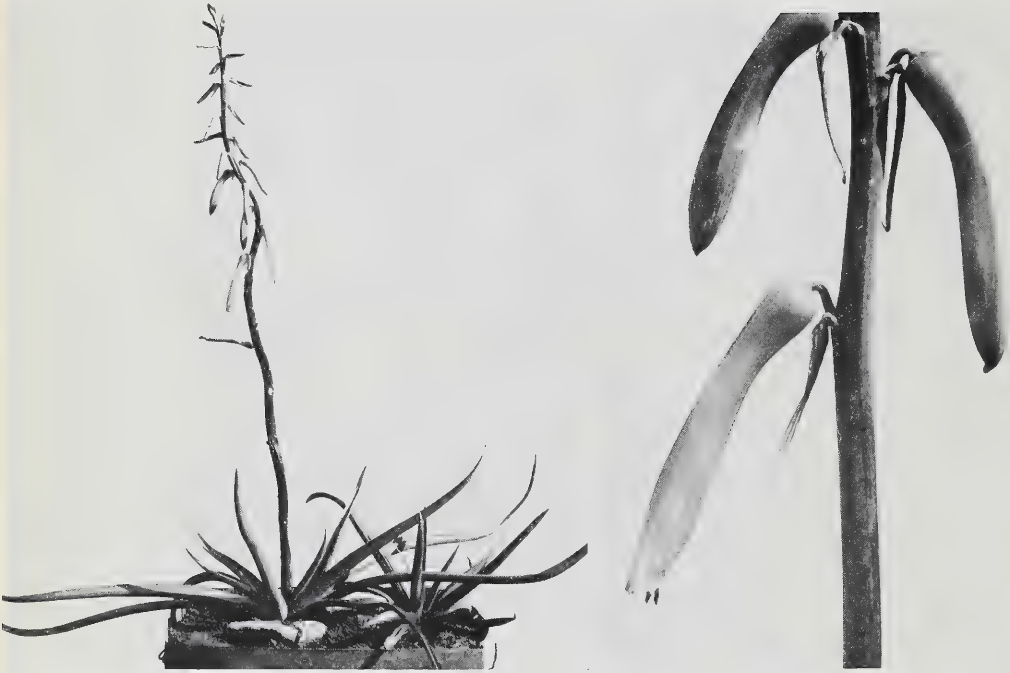

Fig. 1. Fig. 2.

PLATE XIII

Aloe richardsiae Reynolds

Fig. 1. Plant x1/5 approx.

Fig. 2. Portion of raceme with bract, pedicel, and flower natural size.

closed mouth; *outer segments* free for 15 mm. (approximately one-third their length), obscurely 3-nerved; *inner segments* free but dorsally adnate to the outer for two-thirds their length, with 3 crowded nerves forming a slight keel, the apices rather obtuse.

Filaments pale lemon, filiform-flattened, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exserted 1—2 mm. *Style* pale lemon, with *stigma* at length exserted 3 mm. *Ovary* very pale olive-green, 5 mm. long, 3 mm. diam.

ACKNOWLEDGEMENTS

I am deeply indebted to:

Mrs. H. M. Richards, of Abercorn, Northern Rhodesia, for much data and for several plants of this new species, also for data and plants of other species of Aloe.

Mr. John Proctor, Mbeya, Tanganyika, for preparing a detailed map of the area where *A. richardsiae* was found, and for other assistance.

Dr. R. A. Dyer, then Chief, Botanical Research Institute, Pretoria, for photographs and for the facilities of the National Herbarium Pretoria.

The South African Council for Scientific and Industrial Research for Travelling Grants that have enabled me to investigate the Aloes throughout Africa.

A NEW ALOE FROM SOUTHERN RHODESIA

G. W. Reynolds

(With Plate XIV)

Aloe plowesii Reynolds. Species nova in Sect. *Leptoaloe*, *A. wildii* Reynolds affinis, foliis rosulatis carinatis, bracteis et pedicellis magis longioribus facile distinguitur.

Radices fusiformes. *Folia* ca. 10, rosulata, anguste linearia, glauco-viridia, 20—30 cm. longa, 6—10 mm. lata, sensim attenuata, suberecta vel patula; *supra* canaliculata; *subtus* carinata, supra basin minute albomaculata; marginibus dentibus albidis ·5 mm. longis ciliata.

Inflorescentia simplex, 30—45 cm. alta. *Pedunculus* 8 mm. crassus, bracteis vacuis 6—8 ovato-acutis semiamplexicaulibus praeditus. *Racemus* cylindrico-conicus, usque 10 cm. longus, 6 cm. latus. *Bracteae* ovato-acutae, c. 15 mm. longae, 7 mm. latae, 3—5-nervatae. *Pedicelli* 30 mm. longi. *Peranthium* cylindrico-trigonum, coccineum, apice viridulum, 30—35 mm. longum, basi breviter stipitatum, circa ovarium 8 mm. diam.; *segmenta exteriora* libera, *interiora* carinata. *Antherae* 1—2 mm. exsertae. *Stigma* demum 2—3 mm. exsertum. *Ovarium* viridulum, 7 mm. longum, 2·5 mm. diametro. (Plate XIV).

Southern Rhodesia. Chimanimani Mts., along tootpath to Mountain Club Hut among sandstone boulders in short grass, alt. 5,000′—5,800′, fl. 14 Oct. 1962, DCH Plowes 2273 Type (SRGH); Oct. 1960, Plowes 1213 (SRGH); Chimanimani Mtns., fl. August 1947, Munch 8, (SRGH 32424); Gully above upper Haroni, rocky grassland, 4,800—5,000 ft., fl. 3 Feb. 1957, J. B. Phipps 447 (SRGH); Plant coll. Plowes along track to Mountain Club Hut, cult. Mbabane, Swaziland, very robust form, fl. 12 December 1963, Plowes et Reynolds 10049 (PRE).

Mocambique: Manica, Sofala, Chimanimani Mts., fl. 9 July 1949, Pedro et Pedrogaõ 7393! (PRE) appears to belong here.

Along the Chimanimani Mountains in the Melsetter District of Southern Rhodesia there are two species of "grass" Aloe that have been confused for many years. Both grow near each other in grass, both flower at the same time (mostly September—October) and have similar simple inflorescences, but differ considerably in leaves. One has 6—8 leaves that are 10—15 mm. broad and distichous; this is *A. wildii* (Reynl.) Reynolds which was originally wrongly described as a variety of *A. torrei* Verdorn et Christian.

The second closely resembles *A. myriacantha* (Haw.) R & S in general habit of growth with leaves that are rosulate, narrowly linear and 6 mm. broad, keeled and basally much dilated and imbricate-amplexicaul. The flowers resemble those of *A. wildii* but have larger bracts and longer pedicels, and bear no resemblance whatever to those of *A. myriacantha*.

This new species is now named after Mr. D. C. H. Plowes of Umtali, S. Rhodesia, who has contributed much to the advancement of botanical knowledge in S. Rhodesia. He was the first to bring this new species to my notice, and I am indebted to him for plants of both species, which enable the differences to be established. Mr. Plowes found plants on the Chimanimanis growing among sandstone boulders in short grass at the head of Dead Cow Gulch and along the path to the Mountain Club Huts in association with *A. wildii*, from 5,000 ft. to 5,800 ft. There are two forms (*a*) a weaker form growing in grass with leaves shorter, narrower and more erect, and (*b*) a more robust form growing in more exposed positions with leaves broader and longer, the whole plant being much larger. Both forms have flowered in Mbabane, Swaziland, which enabled the description to be completed. The plant figured here is a very robust cultivated growth form of the species, and is much larger than occurs wild.

Description

Plant small, acaulescent, with fusiform roots. *Leaves* about 10, rosulate, basally dilated and imbricate-amplexicaul near ground level, narrowly linear, 20—30 cm. long, 6—10 mm. broad, gradually narrowing to an acute apex, suberect to spreading; *upper surface* dull green, canaliculate, with a few scattered spots in lower portion; *lower surface* carinate, dull green, with numerous crowded small white spots low down; *margins* with minute ·5 mm. long white teeth that are slightly larger and closer low down, smaller, more distant and obsolescent upwards.

Inflorescence simple, 30—45 cm. tall. *Peduncle* 8 mm. thick, with 6—8 sterile bracts that are ovate-acute, long-pointed, 6 mm. broad, 15—20 mm. long, 3—5-nerved.

Raceme cylindric-conical, up to 10 cm. long, 6 cm. diam., the apical buds denser and at first hidden by imbricate bracts, open flowers cernuous to nutant.

Bracts the lowest clasping the pedicel, ovate-acute when pressed flat and about 15 mm. long, 7 mm. broad, 3—5-nerved.

Pedicels 30 mm. long, the colour of the perianth. *Perianth* scarlet, paler to greenish at mouth, cylindric-trigonous, 30—35 mm. long, basally obtuse and shortly stipitate, 8 mm. diam. across the ovary; *outer segments* free to base, greenish at apex, obscurely 3—5-nerved; *inner segments* slightly broader than

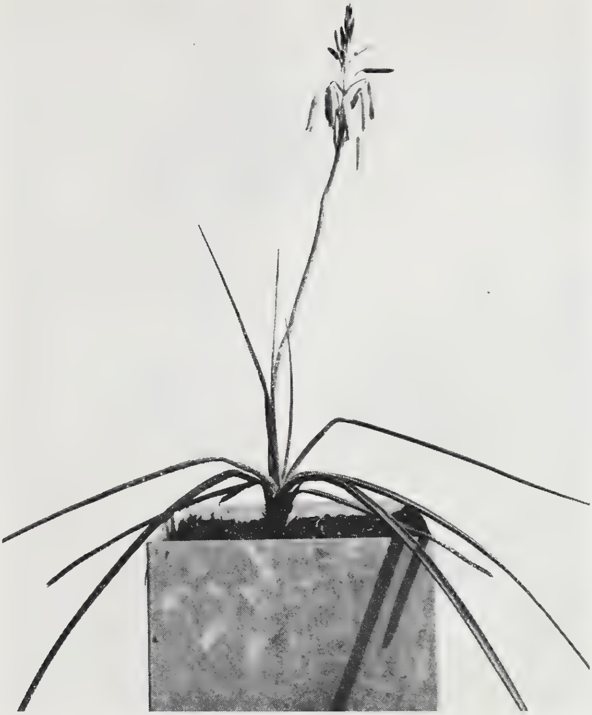

FIG. 1. *Aloe plowesii* Reynolds.

Plant from track to Mountain Club Hut, Chimanimani Mts., Melsetter Dist., S. Rhodesia, cult. Mbabane, Swaziland, fl. 12 Dec. 1963, height 45 cm.—A very robust cultivated form, larger than occurs wild.

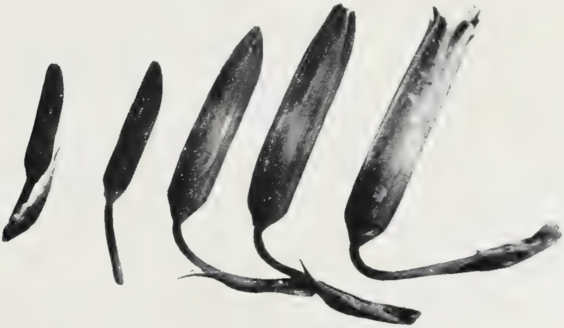

FIG. 2. *Aloe plowesii* Reynolds.

Flowers natural size.

PLATE XIV.

the outer with a scarlet keel throughout, the apices broader and more spreading than the outer; *filaments* filiform-flattened, very pale lemon the 3 inner narrower and lengthening before the 3 outer with their *Anthers* in turn exserted 1—2 mm. *Stigma* at length exserted 2 mm. *Ovary* green, 7 mm. long, 2½ mm. diam.

ACKNOWLEDGEMENTS

I am deeply indebted to:

Mr. D. C. H. Plowes of Umtali, Southern Rhodesia for plants of this and other species of Aloe from S. Rhodesia—specially along the Chimanimanis—and for photographs and much other valuable assistance.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, for photographs and the facilities of the National Herbarium, Pretoria.

The South African Council for Scientific and Industrial Research for travelling grants that have enabled me to investigate the Aloes in S. Rhodesia and elsewhere in Africa.

NOTES ON MESEMBRYANTHEMUM AND ALLIED GENERA

H. M. L. Bolus

Sphalmanthus acocksii L. Bol. sp. nov. (*Eusphalmanthi*).—Planta 1 visa, fera, inter frutices subscandens; radix lignose tuberosa, 7 cm. longa, ad 1 cm. diam.; partes herbaceae sat conspicue papillatae, papillis rotundatis; rami primarii lignescentes, sat rigidi, pallidi, ad 26 cm. longi, internodiis 1—4·5 cm. longis; ramuli ascendentes vel patentes; folia ascendentia vel patentia, omnia opposita, supra plana, linearia vel anguste lineari-lanceolata, e prope medium superne angustata, obtusa vel subacuta, dorso convexo, glauce viridia, 1·5—3 cm. longa, 2—4 mm. lata; flores 1—3-nati, vel demum irregulariter 2-ternati; pedunculi eltimi 1—11 mm. longi; receptaculum globose obconicum, 4—5 mm. longum, 6—7 mm. diam., papillis elongatis acutis; calycis tubus ca. 2 mm. longus, sengmentis 5, e parum supra basim superne angustatis, obtusis vel acutis, 2 extimis cum interiore 1 cm., 2 intimis 5—7 mm., longis, basi 2—4 mm. latis; corolla rosea, tubo ca. 2 mm. longa, segmentis 3-seriatis, obtusis, ad 1·1 cm. longis, ad 1 mm. latis; staminodia ad 8 mm. longa; stamina ca. 8-seriata, ad 6 mm. longa, antheris pollineque luteis; ovarium supra gradatim leviterque elevatum, fere planum, lobis obtuse compressis; stigmata 5, superne non angustata, vix ad 1·5 mm. longa.

Cape Province: in dit. Calvinia, "44 miles W.S.W. of Calvinia, Lokenburg. Occasional in bushes in Heiveld of sandy slopes. Pink-flowered, trailing." Sept. 25, 1954, *J. P. H. Acocks* 17724.

Described from a dried plant and several detached branches and flowering branchlets, with the addition of notes made on living leaves and dissected flowers.

Sphalmanthus gydouwensis L. Bol. sp. nov. (*Eusphalmanthi*).—Radix integer non visa, sed subtuberosa, ut videtur, e reliquiis basi ramorum primariorum; rami decumbentes sublignescentes, in genere inter gracillimos visos, 1—1.5 mm. diam., internodiis in feris 1—3 cm. longis; partes herbaceae, praecipue in feris, conspicue papillatae, papillis rotundis; folia omnia opposita, ascendentia, supra visa lineari-lanceolata plana, ex infra medium superne angustata, apice vero obtuso vel in cultis interdum acuto, 2—4·3 cm. longa, vagina ad 1 mm. longa, medio 3—7 mm. lata; flores solitarii vel 3-nati, pedunculis lateralibus

bracteatis, vel irregulariter biternati; pedunculi 3—20 mm. longi, cum receptaculo dense papillati, papillis interdum elongatis, obtusis vel acutis; receptaculum globose obconicum, demum subglobosum, 6—7 mm. longum, ad 8 mm. diam.; calycis tubus 1·5—2 mm. longus, segmentis 5, e prope basim superne angustatis, acutis vel obtusis, 6—8 mm., vel 8—10 mm., vel rarius ad 13 mm., longis, in flore unico segmento intimo extimis longiore, basi 3—6 mm. latis; corollae tubus ad 1·25 mm. longus, segmentis ca. 4-seriatis, emarginatis vel obtusis vel subacutis, dimidio inferiore citrino, superiore albo, ad 1·3 cm., vel cultis ad 2 cm., longis, 0·5—1 mm. latis; staminodia subnulla; filamenta ca. 8-seriata, pallide citrina, extima ad 1 cm. longa; ovarium inconspicue angulatum, ad 0·75 mm. elevatum; stigmata 5, superne non angustata, ad 2 mm. longa.

CAPE PROVINCE: in dit. Ceres; Gydouw, Oct. 1939, *C. L. Leipoldt* 4425.

Described from wild and cultivated plants which flowered in my garden in Nov. 1940.

In addition to the type of **Sphalmanthus micans** L. Bol. (ante p. 43) the following collections, all without fruit, are represented in the Bolus Herbarium: Calvinia, *L. Starke*. N.B.G. 1704/28. Fl. Jul. 1929. Nieuwoudtville, *P. Ross Frames*. Fl. Aug. 1929. In dry sand, 3—4 miles from Nieuwoudtville on the road to Loeriesfontein, *L. Bolus*. Bolus Herb. 19327. Fl. Sept. 1930. (Also seen on low hills near the village and on the karroid part about 8 miles distant.)

Two collections made in Namaqualand, which seem to be closely allied to *S. micans*, are also represented in the Bolus Herbarium. The earlier one, known only from dried material, was made by *Pearson* (Percy Sladen Memorial Expedition 6414) in Sept. 1911, at Bailey's Vlakte in the Khamiesberg area, "in damp ground, only flowers and tops of leaves above ground." This has the stem 2·5 cm., the short branches about 6 mm., and the slender tap-root up to 3 mm., in diameter. The later collection was made by *E. Esterhuysen* (1332A) in Nov. 1939, between Garies and Leliefontein at Wolfhok, "in flat grassy places." This consists of two specimens in very nearly mature fruit, the larger one having the upper portion of the thick main stem 3·5 cm. in diameter, and three erect woody branches (two of them branched) 2·5—5 cm. long below the current year's growth, which is up to 2·8 cm. long (including the capsule). The capsule is almost entirely enclosed in the calyx (which seems to be accrescent), the lower part being obconic, 5 mm., and the upper part 1·2 cm., long, this being the largest capsule hitherto noted in the genus. After being several hours in water the five valves were finally completely reflexed, with their sides also reflexed, the expanding keels parallel, reaching to about one-third of the valve, and the valve-wings reaching the apex of the keels.

It is hoped that these notes may interest collectors and may lead to further collections being made in this area for a closer study from living material of these insufficiently known plants.

Conophytum clavatum L. Bol. sp. nov. (*Wettsteiniana*).—Planta 1 visa, gracilis, 1·6 cm. alta (sine floribus); vaginae persistentes inferne tenuiter pergamentaceae, politae brunneae, superne subpapyraceae rugosae, atrate brunneae, novellae supra pallidae, sparse brunneo punctatae; corpuscula clavata viridia, inter minima in genere, ad 6 mm. longa, 3·5 mm. diam., ore 1·5 mm. longo, apice rotundo convexulo punctato, punctis leviter elevatis, fere quasi tuberculis, politis, saturatiore viridibus, sparsis vel interdum approximatis, praecipue circum os marginesque; pedunculus 2 mm. longus, parum supra basim bracteatus; bracteae subtruncatae, 1·5 mm. longae, vagina lobos aequante, sinu rotundo; receptaculum ad 1 mm. longum diametroque; calyx ad 5·5 mm. longus, tubo membranaceo, bene exserto, segmentis 4, medio subherbaceo, latissime marginatis, 1 mm. longis; corolla rosea, ad 1·8 cm. longa, tubo superne leviter ampliato, ad 1·2 cm. longo, segmentis 3-seriatis, obtusis vel subemarginatis, ad 1 mm. latis; filamenta e parum supra basim adnata, ca. ad 8-seriata, rubra, infima inter longissima, ad 8 mm. longa, antheris pollineque luteis; discus crenulatus inconspicuus; ovarium leviter elevatum; stylus 9 mm. longus; stigmata 4, ca. 0·75 mm. longa.

Cape Province: Little Namaqualand; "Richtersveld, 10 miles S.W. of Brakfontein, Nov. 1962, *R. C. Littlewood.* Karoo Garden 1327/62. Fl. Feb. 1964. "This small species was found growing in crevices of vertical rock-splits on top of a high koppie." (*C. Littlewood*).

Conophytum meridianum L. Bol. var. **pulverulentum** L. Bol. var. nov.—Plantae 2 visae; vaginae persistentes superne asperae; corpuscula inferne minute papillata, supra minute pulverulenta, ore ciliolato, ad 2·5 mm. longo; bracteae herbaceae; flores 6 dissecti; corollae tubus luteus, segmentis saepe emarginatis, fere ad 2 mm. lata; staminodia exteriora inferne lutea, superne alba; stamina in flore unico 6-seriata, antheris luteis, supremis apicem tubi fere attingentibus; stylus ab ovario non bene distinctis, cum stigmatibus 1·5—2·5 mm. longus, stigmatibus stylum subaequantibus.

Cape Province: "on the farm 'Boonstevlei,' about 10 miles N. of Kliprand," Oct. 1963, *P. A. B. van Breda* 2018/63. Fl. Jan.—Feb. 1964.

In the description of the type I have written "stylus nullus," which I now think is incorrect. In the first two flowers dissected of this variety the style was slightly grooved and also appeared to be the lower part of the stigmas still adhering. In the later flowers the stigmas, sometimes by the deposit of pollen, could be distinguished clearly from the style, but it was not possible to distinguish the style from the ovary. The only capsule seen, a very old one, is elevated to 1·25 mm. in the middle.

Psilocaulon liebenbergii L. Bol. sp. nov.—Ramus 1 visus, e prope terram, ut videtur, scissus, erectus glaber, 35 cm. altus, basi 5 mm. diam., e basi sat copiose ramosus; rami secondarii ad 33 cm. longi, nodis vix constrictis, internodiis saepius 2—2·5 cm. longis et 3 mm. diam., junioribus asperulis ob capillas patentes minutissimas; ramuli oppositi vel alterne evoluti, ultimi floriferi saepius 3—6·5 cm. longi, 4—8-fl.; folia marcescentia tantum visa, apiculata ad 1·9 cm. longa, ca. ad 1·5 mm. diam.; pedunculi 2—5 mm. longi; receptaculum subclavatum vel subglobosum, 2—3 mm. longum, ad 3 mm. diam.; calycis tubus 0·75 mm. longus, sinibus macula rubra parva ornatis, segmentis 5, marcescentibus tantum visis, exterioribus acutis, conspicue aristate apiculatis, 3—4 mm. longis, basi 1—2·5 mm. latis; petala laxe 3—4-seriata, basi brevissime connata, inferne non, vel leviter, angustata, obtusa albida, 4—8 mm. longa, ad 1·25 mm. lata; staminodia subnulla; filamenta ca. 5-seriata, alba, 3—6 mm. longa, antheris pollineque pallidissime luteis; ovarii lobi leviter compressi, ad 0·75 mm. elevati; stigmata 5, gracillima, 3 mm. longa.

CAPE PROVINCE: in dit. Alexandria; Addo Elephant National Park, Jan. 1964, *C. L. L. Liebenberg* 7390. "Flowers with a purplish tinge." (*Liebenberg.*)

Drosanthemum nordenstamii L. Bol. sp. nov. (*Hispicaulia—Defecta*).—Primum humile caespitosum, deinde ramos decumbentes vel prostratos, ad 20 cm. longos, basi ad 2 mm. diam., emittens, internodiis 5—20 mm. longis, brunneis, sat dense hispidis, setis patentibus, longe acuminatis; ramuli floriferi erecti 2-foliati; folia ascendentia vel patentia, supra plana vel convexula, obtusa, dorso rotundo, lat. visa obtusa vel subtruncata, inferne interdum leviter angustata, nitente papillosa, papillis rotundis, saepius 1—1·5 cm. longa, medio 2·5 mm. lata, ad 3 mm. diam., vagina ca. 0·75 mm. longa; flores meridiani; pedunculi hispidi, 1—3 cm. longi; receptaculum obconicum, prope apicem leviter constrictum, ad 3 mm. longum, 4 mm., vel demum ad 5 mm., diam.; sepala 5, subaequilonga, omnia ± marginata, ad 4 mm., vel in flore altero ad 5 mm., longa, basi 1·5—2 mm. lata; petala ca. 2-seriata, e prope medium inferne angustata, obtusa, parum infra medium alba, superne pulchre rosea (pale rose pink), ad 1·3 cm. longa, 1·5 mm., vel fere ad 2 mm., lata; staminodia nulla; filamenta sat pauca, ca. 5-seriata, laxe conferta, mox erecta, ad 4 mm. longa, exteriora epapillata vel obscure papillata, pallide rosea, intima prope basim dense papillata; glandulae subapproximatae; ovarii lobi subobtuse compressi, fere glandulas attingentes easque leviter excedentes, demum vix ad 0·5 mm. elevati; stigmata 5, gracilia, alba vel superne rosea, ad 5 mm. longa cum cauda 1·25 mm. longa; capsula expansa anni prioris 9 mm. diam., seminibus breviter piriformibus, levissimis.

SOUTH WEST AFRICA: "10 miles S. of Witputz," Oct. 1962, *B. Nordenstam* 1159. N.B.G. 786/62. Fl. Nov. 1962, Feb. et Oct. 1963.

Trichodiadema gracile L. Bol. var. **piliferum** L. Bol. var. nov. (*Stricti*).—A forma typica pedunculo cum receptaculo pilifero praecipue differt.

Plantae 2 visae, ferae, 6—7 cm. altae; radix lignose tuberosa, 3·5—7 cm. longa, ad 2 cm. diam.; rami primarii ad 3 mm. diam., secondarii graciles, erecti vel ascendentes vel culti elongati, patentes vel decumbentes, internodiis saepius 1—2 cm. longis vel in ramulis multo brevioribus, 1—1·5 mm. diam., junioribus breviter piliferis, pilis patentibus; folia ascendentia vel fere erecta, supra et lat. visa superne gradatim angustata, dorso rotundo, papillis rotundis vel subovalibus, esetiferis vel prope apicem setiferis, setis in setas apicales, strictas vel laxas, inconspicuas, transeuntibus, 1—1·5 cm. longa, prope medium 1—2 mm. lata crassaque; pedunculi graciles, sat dense piliferi, pilis ad 1 mm. longis vel ultra, 1·5—3 cm. longi; receptaculum globose obconicum, papillis conspicue piliferis, pilis ad 2 mm. longis, 4 mm. longum, 5 mm. diam.; sepala 5, acuta, 3·5—4 mm. longa, basi 2—3 mm. lata, vel 5—7 mm. longa, basi ad 4 mm. lata; petala 2-seriata, e supra medium inferne angustata, obtusa vel subacuta, pallida, inferne roseo vittata, 8—10 mm. longa, ad 1·5 mm. lata; staminodia nulla; filamenta 5-seriata, conice collecta, alba, prope apicem rosea, ad 4 mm. longa, exteriora inferne ciliate papillata, interiora prope medium papillata; glandulae conspicuae approximatae; ovarii lobi compressi distantes, demum ad 1·25 mm. elevati; stigmata 5, anguste subulata, breviter caudata, ad 1·5 mm. longa.

CAPE PROVINCE: in dit. Swellendam; "on stony koppie between cornfields," Aug. 1928, *Emily Ferguson*. Bolus Herb. 21440. Fl. hort. L. Bolus Aug. 1931. Typus. In dit. Riversdale: "Hills near Riversdale," Aug. 1923, *H. M. Bartlett* (*Muir* 2578).

Trichodiadema gracile L. Bol. var. **setiferum** L. Bol. var. nov.—A forma typica pedunculo cum receptaculo pilifero et papillis foliorum setiferis differt.

Locus ignotus: comm. *Ridley*. NBG. 402/14. Fl. Apr. 1926.

The type-material of this variety consists of three branches up to 4 cm. long, taken from the tuberous rootstock when it flowered in 1926, and two drawings made by Miss Carter of the plant with the upper part of the tuber above the ground, 7 cm. long and the flowers 2·8 cm. in diameter. Enlarged drawings were also made of the floral parts. The second drawing represents the plant in full vegetative growth. This was one of the very early succulents sent to Kirstenbosch, and it was still flourishing in 1933 when another flower as large as the earlier ones was preserved on a gummed card. A second collection of this variety has not yet been recorded.

Trichodiadema concinnum L. Bol. sp. nov. (*Radiantia-Barbata*).—Plantae plures visae, ferae 3·5—10 cm., cultae ad 15 cm., altae; radix lignose tuberosa, cum aetate ad 6·5 cm. longa, ramosa, ramis 4—13 mm. diam.; caulis 7 mm. diam. vel ultra in plantis senectis, e basi ramosus; rami primarii erecti vel ascendentes, teretes, basi 3 mm., superne 1—1·5 mm., diam., internodiis levibus, ad 1 cm. longis; ramuli interdum flexuosi, internodiis junioribus interdum breviter piliferis; folia ascendentia vel patentia, fere teretia, apicem versus leviter angustata, viridia, inconspicue papillata, papillis rotundis vel ovalibus, seta obscura nunc prope basim, nunc prope apicem, interdum onustis, 5—9 mm. longa, 1—2 mm. diam., setis apicalibus ad 8 visis, gracillimis pallidis, ad 2 mm. longis; receptaculum obconicum, ad 3 mm. longum, ad 4 mm. diam., cum pedunculo ad 1·5 cm. longo molliter setosum, setis ascendentibus vel erectis, pellucidis, ad 1 mm. vel parum ultra longis; sepala 5, conspicue barbata, 2—5 mm., vel in flore altero 3—6 mm., longa, basi 1·5—2 mm. lata; petala 28—32, exteriora 1—2-seriata, subaequilonga, e supra medium inferne angustata, obtusa, roseo purpurea, ad 1·1 cm. longa, ad 1·5 mm. lata, interiora pauca; staminodia alba, ad stamina conice collecta appressa eaque leviter excedentia; filamenta ca. 3-seriata, alba, interiora medio papillata, antheris pollineque luteis; glandulae sat distantes, obscure crenulatae, dimidium altitudinis ovarii attingentes; ovarii lobi distantes, obtuse compressi, basim glandularum attingentes, ad 0·75 mm. elevati; stigmata 5, dimidio inferiore anguste subulato, superiore caudato, fere 2 mm. longa.

Cape Province: in dit. Alexandria; Bushman's River, Dec. 1950, *H. Hall*. N.B.G. 1559/50. Fl. Maio 1951. Typus. Addo Elephant National Park, Olifantstraat, alt. 1000 ft., Sept. 1953, *Miss S. M. Johnson* 755. Alexandria, *Pillans* 2238. Hillary, prope Sandflats, Aug. 1912, *J. Burtt-Davy* 14286. "Common, used by natives to ferment a Kaffir beer and called T'Kerriemoor." (*Burtt-Davy*.)

This species is closely related to the collections made near Port Elizabeth which have been identified as **T. bulbosum** (Haw.) Schwant. (the fifth and last species dealt with by Haworth) which was published in the Philosophical Magazine and Journal, vol. 64: 428, in Dec. 1824. He saw flowering material in the Royal Gardens at Kew, and gives the size of the old tuberous root, above the ground, as being that of a medium-sized apple, and notes in the course of his further description of the vegetative parts that the leaves, "under a lens are villosulous, their apices being multiradiated." So far his account is a good description of these doubtfully named collections. But all he "observed" of the flowers was: "Flowers ante meridiani mediocres hilariter rubicundi, sed nondum dissectavi." The type of **T. bulbosum** is therefore insufficiently known. In their floral structure these collections are in almost complete agreement with **T. concinnum**, and they may be regarded as constituting a variety of this species, distinguished by the differently shaped tubers, shorter and rather thicker leaves, and the papillae on the leaves being setiferous, the characteristic that Haworth might have referred to when he described the leaves as "villosulous". For they differ from the plant described and figured in 1837 by Salm Dyck (Mesemb.: § 52: 3) as representing **M. bulbosum** Haw., which has

the "peduncles subpapillose, calyx papillose, papillae furnished with minute hairs, calyx-segments equal minute, petals with a darker median line and clavate stigmas." No species of **Trichodiadema** hitherto recorded fully answers to this description and it seems wisest to leave the solution of the problem to a future monographer and a more intensive collecting of this genus.

Ruschia fourcadei L. Bol. forma luxurians.

CAPE PROVINCE: in dit. Ladismith; Huis River Pass, "1—2 ft. high, bushy, numerous on rocky slopes," Dec. 1962, *H. Hall* 2589. Apex of the stem 1 cm. in diameter, the leaves up to 1·5 cm. long.

The type of this species was collected by H. G. Fourcade in the Uniondale Division at Toverwater's Poort, 2,050 ft., in Dec. 1928. In Jan. 1933 he made a second collection in the Humansdorp Division on the south slopes of Slypsteen Berg, N. of Warm Baths, 3,200 ft. No collection east of this has since been recorded and the Huis River Pass is the western limit known of its distribution. Between these limits an earlier collection was made by H. Hall in the Prince Albert Division at Meiring's Poort in June 1953.

This flowered at Kirstenbosch in Jan. 1954, but I failed to recognize its identity with **R. fourcadei,** and it was described as a new species named **R. heteropetala** L. Bol. (Mesemb. III: 277), which must now be sunk in **R. fourcadei.**

The locality of **R. globularis** L. Bol. (Mesemb. II: 413), collected by J. Lückhoff in Aug. 1933, is uncertain, but probably is also Meiring's Poort. I now regard this species, with its globular or subglobular leaves and spinescent branches as merely an extremely drought-stricken form of **R. fourcadei** which must also be sunk.

NOTE.—The type specimens of all new species described in this paper are in the Bolus Herbarium, University of Cape Town, Rondebosch.

(*To be continued.*)

ON THE TAXONOMIC STATUS OF AN ARABIAN ALOE

J. J. Lavranos

(With Plate XV)

Aloe menachensis (Schweinf.) Blatter, in *Fl. Arabica—Rec. Bot. Surv. Ind.*, 8, 463 (1916–36). *A. percrassa* Schweinfurth non Todaro var. *menachensis* Schweinf. in *Bull. Herb. Boiss.* 2, App. II, 64 (1894). *A. trichosantha* Berger var. *menachensis* Schweinf. in *Pflanzenr.* IV, 38, 232 (1908). O. Schwartz in *Fl. Trop. Arab.*, 351, (1939).

The taxonomy of Arabian Aloes presents many difficulties. Type specimens are frequently non-existent, the original descriptions not as complete as might be desired while the type localities, particularly those which lie in the Yemen are, at present, difficult of access. Moreover, many Aloes noted or collected in various parts of Southern Arabia were assigned, without much critical consideration, to one or other of the species previously described either from that area or from neighbouring parts of Africa. Such indiscriminate lumping of fairly heterogeneous elements under a common specific designation has aggravated considerably the confusion surrounding the Arabian section of the genus *Aloe*.

The foregoing reflections seem to apply, if only in part, to one of the Aloes collected by Schweinfurth in March, 1889, near Menakha in the Haraz Mountains which jut out from the Western Escarpment of the Yemen and described by him as *A. percrassa* var. *menachensis*.

A. percrassa Schweinf. non Todaro is none other than *A. trichosantha* Berger. Consequently, Schweinfurth's variety was listed by Berger (*l.c.*) as *A. trichosantha* var. *menachensis*. Berger, however, queries whether it might not represent a distinct species.

Subsequently Blatter (*l.c.*) assigned specific rank to Schweinfurth's plant, but O. Schwartz, in *Fl. Trop. Arab.* lists it once more as a variety of *A. trichosantha* Berger.

A. trichosantha Berger was collected and studied in great detail by Dr. G. W. Reynolds at its type locality at Ghinda, Eritrea and at various other points in that territory and in Ethiopia.

The plant from Menakha is represented in the Royal Herbarium, Kew, by Schweinf. 1685! which consists of a leaf and a raceme, the latter at the end of the flowering stage. The conclusions drawn in the present paper are based on this herbarium sheet and on the descriptions given by Schweinfurth and Berger. A comparison between these and *A. trichosantha* from the African continent reveals significant differences, which may be summarised as follows:

	A. trichosantha Berger	*A. menachensis* (Schweinf.) Blatter
Habit:	Suckering, forming groups Sometimes solitary.	Solitary?
Stem:	None, rarely short, procumbent.	Erect, up to 50 cm. high.
Leaf Rosette:	Sub-densely leaved.	Very compact, "capitate".
Leaves:	·45–50 cm. long, 10 cm. broad at base (Schweinfurth gives 75 x 17·5 cm.); lanceolate - attenuate, suberectly spreading, rather rigid; lighter to darker green, usually spotted; margins with pale cartilaginous border, sinuate-dentate.	Up to 40 cm. long, 16 cm. broad at base; deltoid-acuminate, ascending-incurved, very rigid; purple-green, unicoloured; margins with purple border, distantly toothed.
Peduncle:	Simple to (usually) 2-branched; branches terete.	Many-branched, branches "angular"
Racemes:	25–40 cm. long.	Up to 25 cm. long.
Pedicels:	5 mm. long.	7–8 mm. long.
Perianth:	Straight, 28–36 mm. long; coral-pink with greenish segment apices; shortly hairy-tomentose; outer segments free for 10–12 mm.	Somewhat curved, 30 mm. long; yellow or scarlet; very shortly tomentose; outer segments free for 12 mm.
Filaments:	In turn exserted by 4 mm.	Not at all or only very slightly exserted.

In brief, the two taxa differ widely in habit and the branching of the inflorescence while, moreover, the length of their respective racemes, the form and margins of the leaves, the form and tomentum of the perianths and other details serve as additional distinguishing factors between them. Dr. Reynolds points out that *A. trichosantha* is *not* a mountain species, while the opposite appears to be the case with *A. menachensis*.

The present writer believes that the differences outlined above constitute sufficient reason for regarding the plant from Menakha as a species distinct from *A. trichosantha* Berger. The specific epithet, *A. menachensis* (Schweinf.) Blatter should, therefore, be upheld.

ACKNOWLEDGEMENTS

The author wishes to express his appreciation to:

Dr. G. W. Reynolds, for his invaluable advice in all matters concerning *Aloe*, for reading and commenting upon the present paper, for the accompanying photograph of *A. trichosantha* and for detailed notes on that species.

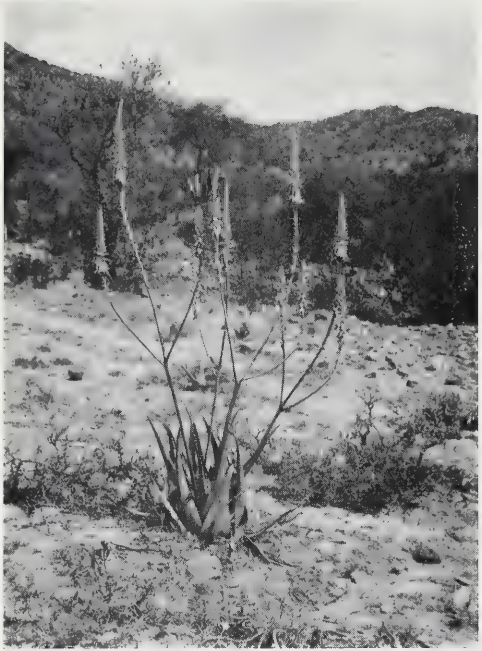

FIG. 1. *A. trichosantha* Berger, near Nefasit, Eritrea.
Photo: By courtesy of Dr. G. W. Reynolds.

PLATE XV.

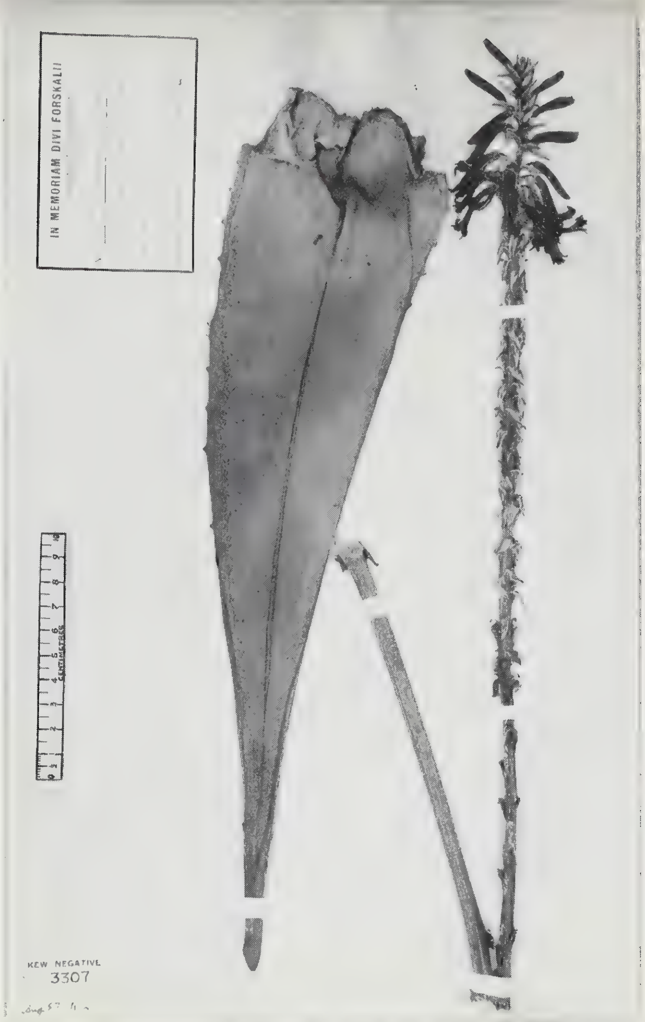

FIG. 2. *A. menachensis* (Schweirf.) Blatter. Herbarium Sheet of Schweinfurth 1685. *Photo: By courtesy of the Royal Herbarium, Kew.*

The Chief, Botanical Research Institute, Pretoria, for the use of the facilities of the National Herbarium, photostatic copies of certain rare works on *Aloe* and much other help.

The Director, Royal Botanic Gardens, Kew, Surrey, England, for the accompanying plate of Schweinfurth's sheet of *A. menachensis*.

NEW STAPELIEAE FROM SOUTHERN ARABIA

J. J. Lavranos

(With Plates XVI and XVII)

Huernia lodarensis Lavranos nov. sp., affinis *H. erinaceae* Bruce et Bally, sed caulibus erectis, valide dentatis, tubo corollae haud constricto, lobis corollae brevioribus latioribusque discedit.

Caules erecti, validi, 5—7 cm. longi, 25 mm. diam. dentibus inclusis, glabri, glaucovirides, purpurei maculati, pentagoni; dentes validi, valde acuti, horizontaliter divergentes; flores bini, ex basi caulium producti, deinceps aperientes; bracteae lineares, acutae, a 6 mm. longae; pedicelli teretes, glabri, ca. 8 mm. longi, 1 mm. diam.; sepala linearea, acuta, carinata, 10 mm. longa, basi 1 mm. lata; corolla 15 mm. longa, 32 mm. diam. inter loborum apices, intus lutescens, anguste purpurea marginata, basi et parte inferiori tubi glabra lineis transversalibus purpureis induta, deinde maculis purpureis, saepe confluentibus et papillis albescentibus, purpureis maculatis, a 1 mm. longis dense induta; extus lutescens, minute tuberculata; tubus campanulatus, 11 mm. longus, 11 mm. latus; lobi patuli, deltoidei, apice leviter reflexo et acutissimo, 9 mm. longi, basi 9 mm. lati, extus prominente 5-nervii; lobi intermedii 1·2 mm. longi; corona exterior fusco-purpurea, 5 mm. diam., basi tubi adpressa, lobis apice rotundatis, obscure bifidis; coronae interioris lobi albescentes, maculis purpureis pauculis induti, glabri, primum erecti et complanati, deinde divergentes et teretes, 3·5 mm. longi, basi 0·8 mm. lati, apice obtuso, haud incrassato.

Type Locality: South Arabian Federation, Audhali Sultanate, on sandy plain 5 miles South of Lodar, lat. 13° 52′ N., long. 45° 51′ E. alt. appr. 900 metres (3,000 feet), coll. August 19, 1962, fl. Pretoria, November 29, 1963, Lavranos 1900 (KEW, holotype).

Stems erect, very stout, 5—7 cm. long, 25 mm. thick including the teeth, glabrous, glaucous-green mottled with purple, 5-angled; teeth stout, very acute, spreading horizontally.

Flowers in pairs from the base of young stems, developed successively.

Bracts linear, acute, up to 6 mm. long.

Pedicel terete, glabrous, ca. 8 mm. long, 1 mm. diam.

Sepals linear, acute, carinate, 10 mm. long, 1 mm. broad at base.

Corolla 15 mm. long, 32 mm. diam. between apices of lobes; outer surface cream, minutely tuberculate; inner surface cream with a narrow purple-brown margin, marked with purple-brown, often confluent spots and densely covered with cream, purple-banded papillae which are 1 mm. long at mouth of tube but shorter towards the apices of the lobes; base and lower part of tube glabrous, cream with transverse purple-brown bands, especially towards the mouth; tube campanulate, 11 mm. long, 11 mm. diam.; lobes spreading horizontally, deltoid, tapering rather abruptly to an elongate, very acute and somewhat reflexed apex, 9 mm. broad at base, 9 mm. long, outside prominently 5-nerved; intermediate lobes 1·2 mm. long.

Outer corona dark purple, 5 mm. diam., glabrous, adpressed against the corolla-tube, the lobes as long as they are wide, rounded and obscurely bifid at their apices.

Inner corona lobes whitish with a few fairly large, purple spots, erect at first, thereafter divergent-ascending, 3·5 mm. long, 0·8 mm. broad at base, flat low down, terete towards their rather obtuse but not enlarged apices, glabrous.

In habit of growth, form and colour of stems, *H. lodarensis* strongly resembles *H. somalica* N.E. Br., *H. hadhramautica* Lavranos, and other species from N.E. Africa and Arabia. From all these it is distinguished by its flowers.

In floral characters our species has its closest ally in *H. erinacea* Bruce et Bally from near Moyale on the border between Ethiopia and Kenya. However, in the latter species, the stems are always procumbent with rounded angles and no prominent teeth. Moreover, the corolla-tube is constricted below the mouth (a character which is absent in *H. lodarensis*) while the strongly revolute corolla-lobes are considerably longer than they are broad.

H. lodarensis is clearly related to the *H. hystrix* group of species and more particularly to *H. volkartii* Gossw. and its variety *nigeriana* Lavranos (*q.v.*) but differs in too many respects from the latter two taxa. It is, consequently, preferable to assign it specific rank. It is, nevertheless, possible that future discoveries of intermediate forms on the African continent may render necessary a taxonomic revision of the entire group to which this species belongs.

H. lodarensis was found by the author on August 19, 1962, under bushes on the sandy plain 5 miles South of Lodar, in the Audhali Sultanate of the South Arabian Federation. It does not appear to be common and was growing, in the partial shade of *Acacia* spp., in association with *Caralluma penicillata* (Defl.) N.E. Br., *C. deflersiana* Lavranos, *Duvalia sulcata* N.E. Br., *Sansevieria ehrenbergii* Schweinf., *Cissus quadrangularis L.*, *C. rotundifolia* (Forsk.) Vahl, *Adenia venenata* Forsk., and other low plants. Its habitat is rather hot and receives an average annual rainfall of some 200 mm. which falls mainly in August and September.

Echidnopsis seibanica Lavranos nov. sp., affinis *E. scutellatae* (Defl.) Berger, sed caulibus hexagonis, floribus minoribus, corolla profunde lobata, coronae

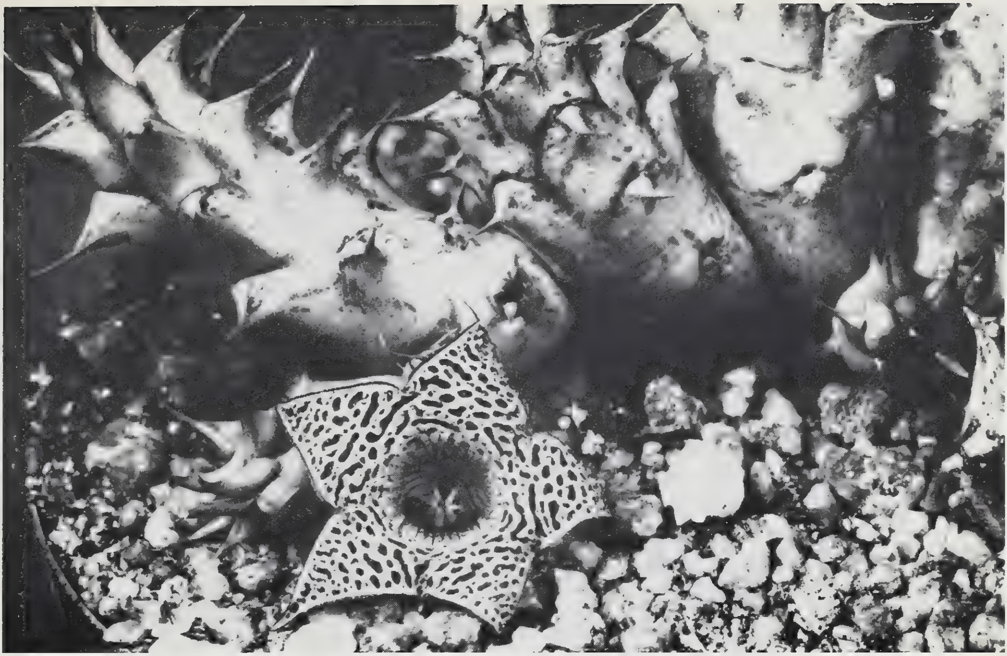

FIG. 1. *Huernia lodarensis* Lavranos, appr. x2.
Photo: Botanical Research Institute, Pretoria.

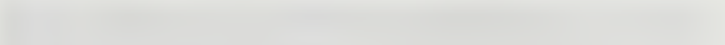

FIG. 2. The sandy plain S.E. of Lodar, habitat of *H. lodarensis* Lavranos. Audhali escarpment in the distance.

PLATE XVI.

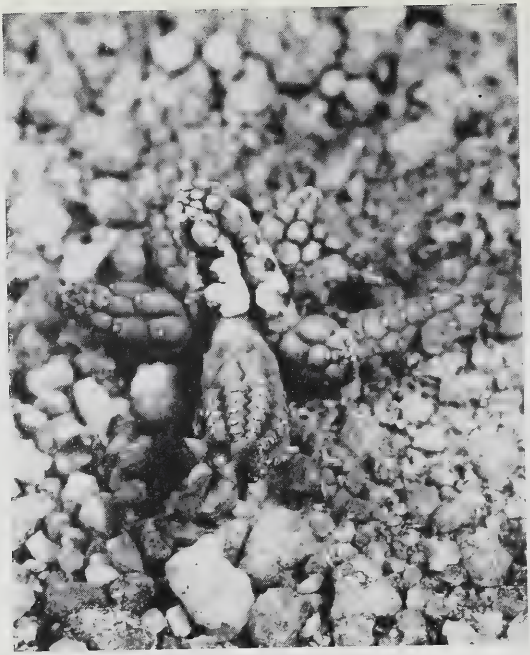

FIG. 1. *Echidnopsis seibanica* Lavranos x1·75.
Photo: Botanical Research Institute, Pretoria.

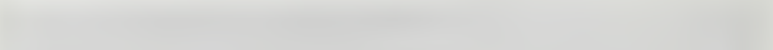

FIG. 2. The limestone plateau south of Mola Matr, habitat of *E. seibanica* Lavranos, with the Kor Seibair in the distance.
Photo: C. Meintjes.

PLATE XVII.

exterioris margine pilis rigidibus armata, lobis coronae interioris brevissimis discedit.

Caules decumbentes, ascendentes vel pendentes, supra vel infra solum ramiferi, 3—15 cm. longi, 6—9 mm. diam., semper hexagoni, virides vel brunneo-virides, subcylindrici, tesselati-tuberculati; folia ovata-cuspidata, 0·8 mm. longa, primum viridia, mox scariosa, denique decidua; flores bini ex parte apicale caulium deinceps producti; pedicelli teretes, flavescentes, 1 mm. longi, 1 mm. diam.; sepala deltoidea, rigidia, flavescentia, 1 mm. longa, corollae tubo arcte adpressa; corolla campanulata, carnosa, 2·5 mm. longa, inter apices loborum 6 mm. diam.; extus minute tuberculata flavescens, parte inferiore parce rubropunctata; intus sulfurea, intra tubum parce et minute rubropunctata, minute tuberculata; tubus 0·75 mm. longus, 2 mm. diam.; lobi 2·5 mm. longi, 1·5 mm. lati, primum adscendentes, deinde patuli sectione convexi, deltoidei, apice rotundato; corona exterior cupuliformis, 1·5 mm. diam., marginibus erectis, lobis 5, brevibus, rotundatis, apice truncatis, roseo-flavescens, rubro-purpurea punctata, loborum apicibus fuscis rubropurpureis, margine pilis rigidibus, brevibus, incoloribus, introspicientibus parce instructo; coronae interioris lobi 0·3 mm. longi, albidi, purpurei punctati, supra antheras arcte incumbentes sed eis dimidio breviores, corona exteriore adnati, adscendentes.

TYPE LOCALITY: Southern Arabia, Hadhramaut, Southern slopes of Kor Seiban, lat. 14° 47′ N., long. 48° 48′ E., alt. appr. 1,800 metres, coll. August 21, 1962, fl. Pretoria December 16, 1963, (KEW, holotype).

Stems branching freely above ground or subterraneously, procumbent, ascending or pendent, 3—15 cm. long, 6—9 mm. diam., uniformly six-angled, green or brownish-green, sub-cylindric, the tesselately divided tubercles arranged in neat rows.

Leaves ovate-cuspidate, green on young growth, soon becoming scarious, at length deciduous, 0·8 mm. long.

Flowers in pairs from near the apex of the stems, developed successively.

Pedicel terete, greenish-yellow, minutely tuberculate, 1 mm. long, 1 mm. diam.

Sepals deltoid, rigid, greenish-yellow, 1 mm. long, adpressed against the corolla tube.

Corolla campanulate, fleshy, 2·5 mm. long, 6 mm. diam. between apices of lobes; *outer surface* minutely tuberculate, cream; with a few reddish spots on the tube; *inner surface* sulphur-yellow with minute red spots within the tube and on the lower part of the lobes, minutely tuberculate; *tube* 0·75 mm. long, 2 mm. diam.; *lobes* deltoid and with a rounded apex when pressed flat, convex in transverse section, ascending at first, then spreading, 2·5 mm. long, 1·5 mm. broad at base.

Outer corona cupular, 1·5 mm. diam., with erect margins and five rounded,

erect, rather truncate lobes, pinkish with red-purple spots, the apices of the lobes red-purple; a few colourless, stiff hairs arise from the inner surface of, and at right angles to, the margin of the outer corona.

Inner corona lobes ascending, deltoid, convex, less than 0·3 mm. long, whitish with numerous, minute, red-purple dots, closely incumbent upon but very much shorter than the anthers, adnate at their base to the outer corona below the sinuses separating the outer corona lobes.

E. seibanica has its closest ally in *E. scutellata* (Defl.) Berger. In the latter species, however, the stems are stated to be uniformly 8-angled while in *E. seibanica* they are 6-angled, almost without exception. In *E. scutellata*, the flowers are larger (ca. 10 mm. diam.), the corolla-lobes deltoid, acute and as broad as they are long, rather flat in transverse section and with revolute margins. The cupular corona is yellow, with margins that are spreading and not erect as in the new species. The inner corona lobes are slightly longer than and horizontally incumbent upon the anthers. Finally *E. seibanica* appears to differ from its closest ally as well as from all other members of the genus by virtue of the stiff, colourless setae which radiate inward from the margin of the outer corona.

Our species was found in considerable numbers on limestone, in the vicinity of the Government Rest House of Mola Matr, which is 54 miles by road to the North of the port of Mukalla in the Hadhramaut, and lies at the Southern foot of the Kor Seiban, highest mountain in the Hadhramaut. It appears to be plentiful in this area.

It was grown successfully in the collection of the Botanical Research Institute, Pretoria, where it flowered on December 16, 1963.

In its habitat, our species was found growing in exposed places, in association with Acacia spp., *Euphorbia balsamifera* Ait., *E. phillipsiae* N.E. Br., *Kalanchoe teretifolia* Defl., *Dorstenia foetida* (Forsk.) Schweinf., *Ficus salicifolia* Vahl, *Aloe inermis* Forsk. (= *A. luntii* Baker), many other Stapelieae, low growing Compositae, Leguminosae and others.

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A CONTRIBUTION TO THE MORPHOLOGY OF *ZANNICHELLIA ASCHERSONIANA* GRAEBN.

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Introduction

When describing plants with extremely reduced floral parts and complex inflorescences, it is of the utmost importance that the gross morphology is fully understood.

In the case of the pondweed *Zannichellia aschersoniana* Graebn. (1907), the inadequate type description, which omitted the structure of the male flower altogether, has resulted in some confusion in subsequent accounts of the dispecific genus Zannichellia L. in general taxonomic works. For this reason, a detailed account of the morphology of *Z. aschersoniana* is given below.

The species, apparently endemic to the Cape South West, is an annual growing in seasonal vleis. Living flowering material from vleis just inshore from Table Bay near Paarden Island and Milnerton, near Kommetjie, on the Cape Flats, and near Hermanus and Lamberts Bay was examined, also type material: "Pools above Varsche Vlei" Wolley Dod, 3586 (BOL).

Morphology

The size of the plant appears to be governed by the depth attained by the seasonal body of water in which it is growing.

Erect stems, with a diameter of about 0·6 mm. which may be branched and attain a length of up to 40 cm., arise at most nodes of a branched creeping rhizome. The leaf arrangement is alternate, and nodal lengths in erect stems of up to 6 cm. have been recorded. (Fig. 2A.)

Leaf length increases acropetally, but the degree of difference in length between leaves at basal and apical nodes varies from one to several centimetres. Mature leaf lengths of from 1·0 to 6·5 cm. have been recorded. The leaf blade has a central midrib, a rounded acuminate apex, and is 0·5 to 1·5 mm. wide. From the base of the leaf extending upwards for about 3 to 7 mm., depending upon leaf length, the margins are expanded on either side to form a membranous sheath which completely encircles the stem at the node. This sheath forms a ligule-like projection at its apex, extending about 0·5 mm. above the line of fusion with the leaf (Fig. 2B). The membranous corners of this ligule are very slightly auriculate but often become eroded away during the life of the plant. In the very young stages this sheath forms a short tube around the stem, which later splits.

In the axil of each leaf, on either side of the axillary bud are two small membranous scales, usually about a millimetre in length and less than 0·1 mm. wide. The axillary buds are enclosed, whether vegetative or reproductive, by a membranous sheathing bract up to 6 mm. long.

The rhizome also bears leaves at the nodes similar in structure to, but generally shorter than, those on the erect stems; these usually fall away during the life of the plant. Also at each node, one to several adventitious roots arise, with a fine covering of root hairs for their entire length, which may be up to 20 cm. When the adventitious roots first appear they are enclosed in a protective sheath which persists as a small collar of tissue 0·1 mm. long at the base of the root. The diameter of the rhizome is the same as that of the erect stem, and that of the adventitious roots is about 0·3 mm. Rhizome nodal lengths of up to 2·5 cm. have been measured.

Where upright stems occur at the nodes, growth is sympodial; the main axis continues as the erect shoot, while the rhizome is continued by growth of an axillary branch. At the point where it arises in the axil of what must be now considered the basal leaf of the erect shoot, the rhizome is encircled by a membranous sheathing bract about 3 to 5 mm. long (see Fig. 2C). At first this bract is tubular but later it splits from the apex downwards and eventually may fall away. This bract and those surrounding the axillary buds of the erect shoots may be considered as modified first leaves of axillary shoots.

The inflorescences are axillary, male and female being borne together in a compound inflorescence of a sympodial nature (Fig. 1A, B). At the base of the inflorescence is the aforementioned membranous bract (Fig. 1A, B, a) which, in the early stages, forms a sheath-like cap completely enclosing the developing inflorescence (Fig. 1C). Later this sheath splits, and at floral maturity it is spathe-like, about 3 to 6 mm. long and 1·5 to 2 mm. wide.

The lower first inflorescence axis generally terminates in a male flower, and on this axis is borne a second modified foliage leaf (Fig. 1A, B, b). The shape and degree of development of this leaf varies considerably (Fig. 1D). When mature it may be entirely membranous with a central projection indicating an extremely reduced lamina, or the central projection may be more pronounced, with a green tip, or there may be a definite demarcation between a central green lamina and a membranous sheathing base. No cases were found where the sheathing base had become ligulate. In length this leaf varies from about 2·5 to 4·5 mm., its width (at its widest part) is about 1 mm.

In the axil of this leaf is a second upper inflorescence axis which usually terminates in a female flower. This second axillary inflorescence is surrounded by a second membranous sheath (Fig. 1A, B, c) similar in structure and development to the membranous bract surrounding the first axis; at floral maturity this may be 2 to 4·5 mm. long and 1 to 1·5 mm. wide. Just below the terminal flower is another modified foliage leaf (Fig. 1A, B, d). Again the degree of development of this is variable, but it is generally more leaf-like than the equivalent leaf on the lower inflorescence axis, with a prominent central green lamina. In the axil of this leaf is an axillary bud, protected by the usual membranous sheath, which in most cases remains dormant. However, it may grow out to form a third inflorescence axis or a vegetative shoot. In this event, the subtending leaf may develop a ligulate base and attain a length of over a centimetre. On the other hand, when the axillary bud is poorly developed the subtending leaf may be very small and membranous.

The flower on the lowest axis matures first. While the first axis of this cymose inflorescence usually terminates in a male flower and the second in a female flower, other arrangements are not uncommon. The order may be reversed, or both flowers may be of one sex, or, rarely, only one flower may develop.

The male flower (Fig. 1E) consists of a single compound stamen borne on a long slender stalk, about 25 mm. long at the time of anther dehiscence, and 4 apical anther lobes, each about 3 to 4 mm. long and dehiscing by means of a longitudinal slit (the mature pollen is globose). There is a conical projection, about 1 mm. long or less, of the anther connective above the anthers. The bases of the anther lobes are free from the central stalk for about one quarter of their length, and in the early stages of development each lobe is bilocular. It is probable that these represent two fused bilobed anthers. The question arises whether the stalk upon which these are borne is a compound filament or a pedicel. At the base of this stalk, several small hair-like membranous scales about one mm. long are to be found, which are extremely difficult to dissect out. It was at first suspected that these might represent a perianth at the base of a compound filament, but it is more likely that they are morphologically similar to the two small scales found in the axils of every normal foliage leaf.

The female flower (Fig. 1F) has a short peduncle, 0·2 mm. long, above the reduced foliage leaf. There is a sac-like membranous perianth which surrounds the single carpel and part of the style. The ovary is unevenly inflated so that one side of it bulges more than the other. The style ranges from 1 to 2 mm. in length,

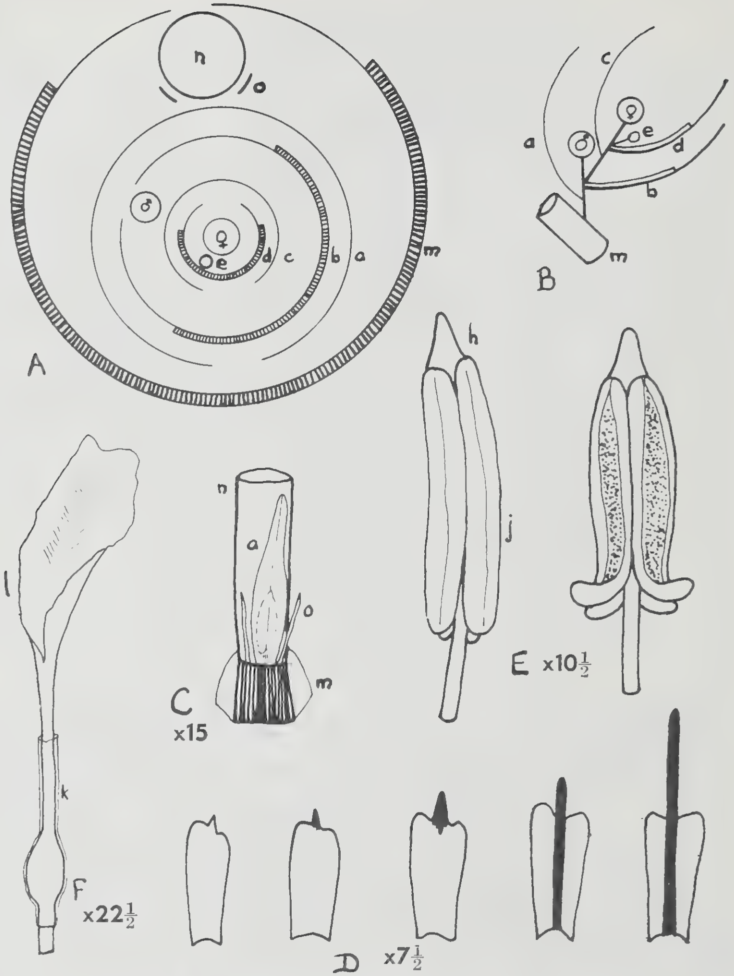

FIG. 1. A and B, diagrams of inflorescence (in B the length of inflorescence axes is greatly exaggerated): *m* leaf on main stem *n*, *o* scales on either side of axillary bud, *a* membranous bract at base of first axis, *b* reduced leaf on first axis subtending second axis, *c* bract at base of second axis, *d* reduced leaf on second axis subtending undeveloped axillary bud *e*; C leaf bent back showing young axillary bud enclosed in membranous sheath ×15; D different degrees of development of leaf *b* ×7½; E male flower before and after dehiscence ×10½: *h* projection of anther connective, *j* one of 4 anther lobes; F young female flower ×22½: *k* sac-like perianth, *l* funnel shaped stigma.

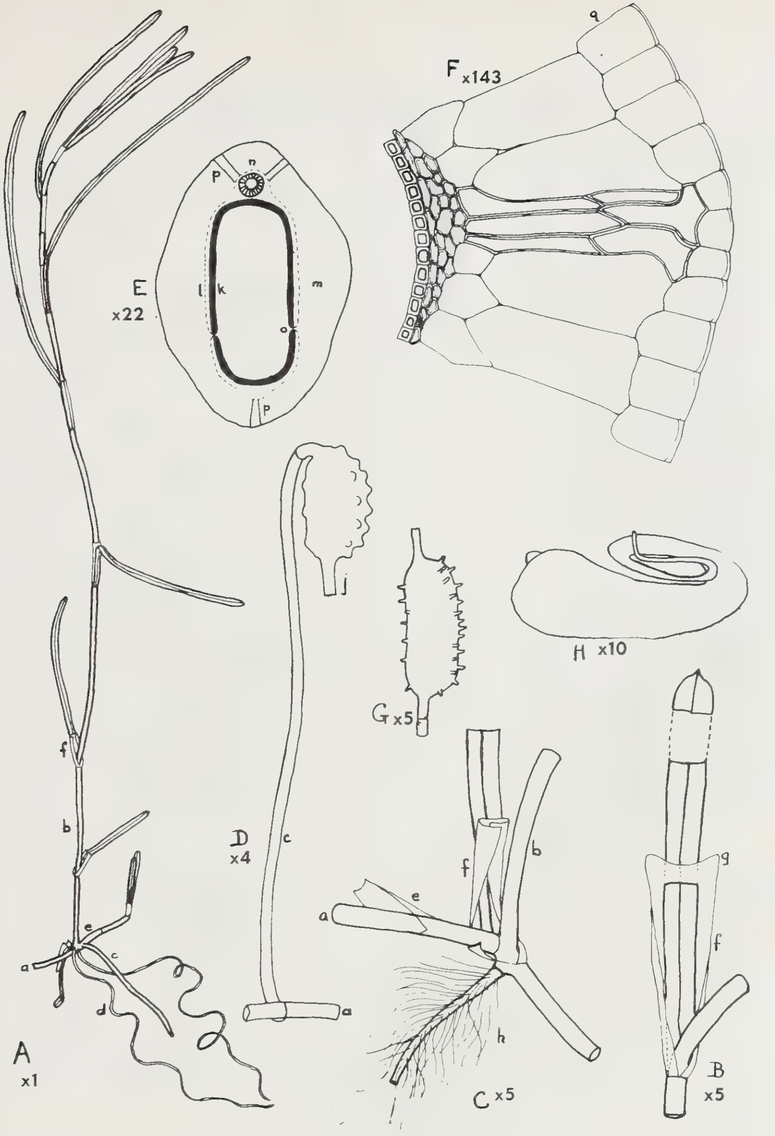

FIG. 2.—A portion of plant showing part of rhizome *a*, and an erect shoot, *b*, × 1: *c* positively geotropic fruit peduncle, *d* adventitious root, *e* basal sheath of new rhizome axis, *f* sheathing leaf base; B leaf × 5: *g* ligulate extension of sheathing base; C portion of rhizome showing sympodial growth × 5: *h* root hairs; D green fruit from rhizome node × 4: *j* remains of style; E diagram of transverse section of pericarp × 22: *k* inner cuboidal cells. *l* small squashed cells, *m* outer parenchyma layers, *n* vascular strand surrounded by sclerenchyma sheath, *o* thin-walled cells of endocarp, *p* groups of slightly lignified elongated cells; F anatomical detail of pericarp wall × 143: *q* epidermis; G old pericarp with outer layers sloughed off × 5; H embryo with coiled cotyledon × 10.

and terminates in a funnel-shaped stigma, elongated on one side (up to 2 mm. in some mature forms).

At maturity the fruits are stalked. Those fruits borne on inflorescences arising in the axils of rhizome leaves, and the lower leaves of erect shoots, are up to 4 cm. long and positively geotropic, burying the fruit in vlei mud. The peduncles of fruits borne higher up on erect shoots are only a few mm. in length —often not more than one millimetre. The slight uneven inflation of the ovary is more emphasised in the fruit. The style is persistent, the funnel-shaped stigma withers away.

While still green, the pericarp has a patterning of warty protuberances and when mature may be 3 to 4 mm. long and 1·0 to 2·5 mm. wide (Fig. 2D). In transverse section the fruit is oval (Fig. 2E). The innermost layers of the pericarp consist of small cuboidal cells whose walls are heavily lignified; to the outside of these is a unicellular layer of small, somewhat squashed cells with slightly thickened walls. At each end of the oval, that is in lines running down the dorsal and ventral sides of the pericarp, this layer is several cells thick. At one end of the oval a small vascular strand surrounded by a sclerenchyma sheath abuts onto this layer of squashed cells. Towards the opposite end, on either side, is a point where a few of the cuboidal endocarp cells, and the small squashed cells to the immediate outside of these, are thin walled. This results in two V-shaped grooves —presumably the future lines of dehiscence of the pericarp.

Between the small squashed cells and the outer epidermal cells, is thin-walled, spongy chlorophyll containing parenchyma, usually in two layers, the inner smaller, the outer larger. The outer walls of the epidermal cells have a slight cellulose thickening.

At intervals, usually not more than four being seen in any transverse section, groups of elongate slightly lignified cells extend from the small layer of squashed cells to the epidermis, resulting in the warty protuberances seen in the green pericarp (Fig. 2F). As the pericarp matures the inner cuboidal cells, the squashed small cells and the groups of lignified elongated cells become suberised. The epidermis and spongy parenchyma cells slough off, leaving the dark brown inner layers of the pericarp, with spiny projections up to 0·3 mm. long, near the dorsal and ventral edges of the laterally compressed fruit (Fig. 2G).

The seed is pendulous, the placenta being on the inflated side of the ovary wall, just below the base of the style. Removal of the membranous testa exposes the single coiled cotyledon (Fig. 2H).

On the Cape Peninsula and Cape Flats the seasonal vleis are normally completely dry by the end of November. On the surface of the sun-baked mud, old Zannichellia plants form a thin dry mat, in which are entangled dormant fruits. Those fruits which developed on the lower parts of the plant may have been pushed into the mud by their long positively geotropic pedicels. Presumably this affords greater protection in cases of extreme drought. Germination starts soon after the first rains begin to fill the vleis.

Taxonomic Note

In Ascherson & Graebner's classification (1907) of the Potamogetonaceae, Zannichellia L is placed in the tribe Zannichellieae Kunth., distinguished by unisexual flowers, the persistent presence of a perianth in the female flower and weakly saline or fresh water habitat. This tribe is divided into two genera, Zannichellia, characterised by naked male flowers and female flowers with a cup-like perianth enclosing one to eight free, slightly curved carpels; and Althenia Fr. Petit, with a short cup-like perianth in the male flower and a perianth of three bracts surrounding three straight carpels in the female flower.

Althenia is divided into two sections, Eualthenia Graebn., consisting of one species *A. filiformis* Fr. Petit and Lepilaena (Drumm.) Aschers., now reinstated as a separate genus by most taxonomists. In Lepilaena Drumm. of Australia and New Zealand the androecium consists of two or three fused bilobed anthers immediately below which is a short, cup-shaped perianth, the whole being born on a pedicel. In the more widely distributed Althenia, the anther is single and with one lobe, in other respects the male flower is similar to that of Lepilaena.

Graebner divides Zannichellia into Euzannichellia Graebn. with leaves with "free basal stipules" to which belongs the cosmopolitan *Z. palustris* L.; and Pseudo-Althenia Graebn. "with sheathing leaf bases" incorporating *Z. aschersoniana*. There is no mention of leaf arrangement which appears to be alternate, opposite or whorled in *Z. palustris* and persistently alternate in *Z. aschersoniana*.

Apart from the generic description of Zannichellia where Graebner writes: ". . . no long peduncle in the male flower, the anthers occasionally paired (interdum binis) with two thecae on a longitudinal excurrent connective.", there is no specific description of the male flower for either species. The illustration of *Z. palustris* shows a shortly stalked apparently bilobed anther, but it is not clear whether by "interdum binis" Graebner meant two such stalked anthers or the four lobed compound anther (which is eight celled when young) of *Z. aschersoniana*. Presumably "two thecae" means two anther lobes which would be four celled when young. The only living material examined of *Z. palustris*, which came from near Rietmonds Poort North East of Calvinia, had male flowers each with two anther lobes.

Subsequent accounts of the male flower in descriptions of Zannichellia and *Z. palustris* in general reference works are insufficient and confusing. Jepson (1923–25) writes of Zannichellia: "staminate flowers consisting of an anther on a pedicel-like filament,"; Phillips (1926) of Zannichellia: "Stamens 1;

filament slender; anther 2—4 thecous."; Hegi (1935) of *Z. palustris* "Männliche Blüten . . . aus einzigen, seltener (bei kräftigen Examplaren) aus zwei sitzenden Antheren (die sich dann den Rücken zuwenden) bestehend. Antheren mit 2 länglichen Hälften . . ."; Abrams (1940) of Zannichellia: " . . . 2 celled anther on a short pedicel-like filament"; Britton & Brown (1943) of Zannichellia: ". . . single 2 celled anther"; Fernald (1950) of Zannichellia "staminate (flowers) consisting of a single stamen with a slender filament bearing a 2—4 locular anther;" Adamson (1950) of Zannichellia: "Male flowers with 1 stamen, anther 2-lobed"; and Cabrera (1953) of Zannichellia: "Flor masculina pedunculada, desnuda con 1—2 anteros 2-tecas."

It is interesting to note that G. Bentham (1865) wrote of *Z. palustris* "Male flower of one stamen . . . anthers 2 or 4 celled."

If the male flower of *Z. palustris* persistently consists of one bilobed anther or two bilobed anthers on separate filaments, as opposed to the apparently constant four lobed anther in *Z. aschersoniana*, this could be a distinction of considerable taxonomic importance. The genus Lepilaena, with a similar compound condition in the male flower, is separated from Althenia on these grounds.

With reference to the female flower, while Graebner never stated categorically that in *Z. palustris* it consisted of more than one carpel, this was implied by the generic description of the female flower, and the inclusion of number of carpels in his key to the species. Section Euzannichellia has "fruits frequently two or more", while section Pseudo-Althenia has "fruits single or paired."

In the generic description Graebner writes: "Female flower with cupular perianth surrounding the base of the carpels. Carpels 1—8". This condition in *Z. palustris* is illustrated in fig. 34c of their monograph. As has been seen, in *Z. aschersoniana* each female flower persistently consists of one carpel enclosed in its own perianth.

A number of subsequent authors, for example Fernald (1950) and Clapham, Tutin and Warburg (1952) in their accounts of Zannichellia consider each carpel as a separate naked female flower, all being enclosed in a common cup-shaped involucre. Again descriptions of the female flower(s) in general accounts of the genus are insufficient, most authors giving carpel number (per leaf axil) as two or more.

It is evident that a revision of description and interpretation of floral morphology in *Z. palustris*, incorporating all the forms of this widespread species, is necessary. This may well lead to the placing of the two species of Zannichellia in two separate monospecific genera.

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SOME MANUSCRIPTS RELATING TO SOUTH AFRICAN BOTANY IN THE WILLIAM SHERARD COLLECTION IN THE BODLEIAN LIBRARY AT OXFORD

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The first record of a South African plant was an illustration of *Protea neriifolia* in the *Exoticorum Libri Decem*, 1605 of Clusius. Justus Heurnius (1587–1651 or 2) made the first collection of plants from the Cape of Good Hope. He also made some drawings, which he sent to his brother Otto, a Professor in Leyden. These were the originals for five plates in Johannes Bodaeus Stapelius' *Theophrastii eresii de historia plantarum*, which was published in 1644. It was, however, Paul Hermann (1646–1695) who made the first important collection of plants.

Hermann, who was born in Halle, Saxony, took his medical degree in Padua. Arnoldus Seyn, Professor of Botany at Leyden, recommended him to Rheede tot Drakenstein, at that time Governor of the Dutch possessions in Malabar, as a botanist capable of investigating the flora of Ceylon. Hermann would appear to have collected at the Cape on his outward journey to Ceylon in 1672. James Petiver (c. 1663–1718), a wealthy London apothecary, bought, for Sir Hans Sloane, a collection of Hermann's Cape plants at the sale of Hermann's herbarium in 1711. These form Vol. 75 of the Sloane Herbarium which is in the British Museum (Natural History). Some of these plants were described and illustrated in Hermann's *Paradisus Batavus* which was published from his MS. by William Sherard in 1698.

Among the Sherard MSS. at Oxford is a draft of part of the *Paradisus* (MS. 181) and drawings of plants by Hermann intended to illustrate the *Catalogus plantarum* at the end of this work (MS. 178). MS. 179 is entitled 'Hermann's journal in Dutch of a botanical expedition from the Cape of Good Hope, Aug. 1685–Jan. 1686'. This is in fact a copy, made by Hermann, of what is considered by Waterhouse to be the official account of Simon van de Stel's (1639–1712) journey to Amacqualand (Namaqualand) 1685–1686. The original MS. belonged to Fagel (1765–1838) whose collection was acquired by Trinity College, Dublin, in 1802. Waterhouse published this Fagel MS., with a translation and notes, in 1932. The Hermann transcript appears to be identical with it, though it lacks copies of the 71 drawings of animals and plants that had been made by Hendrik Claudius. There are many blank pages, which correspond to the position of the drawings in the Fagal MS. Hermann was obviously acquainted with the Fagel family as another MS. (184), a notebook, contains a heading 'Hortus Fagelianus'.

Somewhat before 1680 Hermann returned to Holland to take up his appointment as Professor of Botany at Leyden. This appointment included responsibility for the Leyden botanic garden. Boerhaave (1668–1738), who succeeded Paul Hermann, stated that although he was in charge of the garden for only a few years he did more to improve it in that time than his predecessors had done in a hundred and five years. It was while Hermann was in Leyden that William Sherard spent a considerable time with him learning from him and later helping him to identify his Cape collection.

There were many famous gardens in Holland at this time. The second half of William Sherard's *Scola botanica*, 1689, bears the sub-title, *Paradisi Batavi prodromus* and is a list of some 1,000 plants arranged alphabetically, which were growing in Dutch gardens at that time. This list was no doubt made with the aid of Hermann's MS. notes on exotics recently introduced into Holland. A number of Cape plants were among those that had been acclimatised in Dutch gardens at this time. Hermann and Sherard therefore had some living material to aid their studies of the Cape flora.

It was also customary to employ an artist to draw some of these new introductions as they flowered. Boerhaave in 1727 (letter in Sherard MS. 174) bought such a collection for Sherard from Levinius Vincent (1658–1727). Vincent was an Amsterdam merchant who acquired through marriage the famous museum of Anthonie van Breda. These drawings (MS. 188), entitled 'Herbarium Capense', are signed A. B. del and were no doubt drawn by van Breda who was known to be a fine artist. He was either recording the plants growing in his own garden or in those of his friends.

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A NEW STAPELIA FROM THE WESTERN CAPE PROVINCE, SOUTH AFRICA

J. J. Lavranos and H. Hall

(With Plates XVIII and XIX)

Stapelia choanantha Lavranos et Hall sp. nov. nullae aliae arctae affinis, quae forsitan sectionem propriam generis *Stapeliae* constituere debet.

Caules procumbentes vel pendentes, 10—30 cm. (tenus 200 cm.) longi, 6—10 mm. (tenus 12 mm.) diam., glabri, glaucovirides, juvenes brunnei maculati, quadragoni, angulis obtusis, haud dentatis; flores 2—6 e pedunculo cuspidato producti; pedicelli ca. 10 mm. longi, 1 mm. diam., teretes, glabri; sepala ovata-deltoidea, acuta, sectione convexa, glabra, 3·5 mm. longa, basi 1·2 mm. lata; corolla campanulata, extus basi rosea, deinde rubropurpurea, glabra, intus fusca rubropurpurea, glabra, 18 mm. longa, 20 mm. diam. inter apices loborum; tubus infundibuliformis, sectione pentagonus, 16 mm. longus, ad orem 11 mm. diam.; lobi deltoidei, acuti, 6 mm. longi, basi 7 mm. lati, patuli, supra velutini, marginibus leviter revolutis; corona exterior basi pentagona, 2·8 mm. diam., basi tubi corollae adpressa, basi albo-rosea, lobis 1·5 mm. supra basi coronae nascentibus, fere erectis, fuscis rubrobrunneis, intus profunde canaliculatis, 2·3 mm. longis, 1 mm. latis, ovatis, apice tridenteis, dentibus lateralibus subulatis, dente medio deltoideo valde longioribus; coronae interioris lobi 5 mm. longi, biscornuti, cornis interioribus rubrobrunneis, 4·5 mm. longis, basi complanatis et supra antheras incombentibus, deinde teretibus, haud conniventibus, erectis, sensim attenuatis, leviter divergentibus, apice acutis, cornis dorsalibus 3·5 mm. longis, erectis, ad interiora similibus.

TYPE LOCALITY: Cape Province, Huis River Pass, approx. 5 miles West of Calitzdorp, alt. approx. 3,000 ft., coll. September, 1962, P. C. H. Salter, A. Möller and B. Ramsey, coll. December 1962 Hall 2579 (BOL. holotype) fl. Kirstenbosch, Nov. 1963.

Description

Stems procumbent or pendent, 10—30 cm. (up to 200 cm.) long, 6—10 mm. (up to 12 mm.) diam., glaucous green with brownish patches mainly on young growth, 4-angled, the angles rounded and without distinct teeth except on very young shoots.

Flowers 2—6 together, from a cuspidate peduncle arising from the groove between the stem angles, developed successively.

Bracts short, linear, scarious.

Pedicel ca. 10 mm. long, 1 mm. diam., terete, glabrous, pink.

Sepals narrowly ovate-deltoid, convex in section, 3·5 mm. long, 1·2 mm. broad at the base, glabrous.

Corolla campanulate, outside pink on lower half of tube, thereafter mottled with and finally uniformly reddish-purple, inside reddish-purple, glabrous throughout, 18 mm. long, 20 mm. diam. between apices of lobes; *tube* funnel-shaped, pentagonal in section, 16 mm. long, 11 mm. diam. at the mouth; *lobes* deltoid, acute, horizontally spreading, 6 mm. long, 7 mm. broad at the base, the margins somewhat revolute, the upper surface velvety.

Outer corona at base pentagonal, 2·8 mm. diam. and adpressed against the corollatube, light pink to the base of the lobes; lobes almost erect, arising at ca. 1·5 mm. from the base of the outer corona, dark red-brown, deeply canaliculate on the inner surface, 2·3 mm. long, 1 mm. broad with a 3-toothed apex, the middle tooth deltoid and much shorter than the subulate lateral teeth.

Inner corona lobes 5 mm. long, red-brown, two-horned; inner horns 4·5 mm. long, at first flattened and incumbent upon the anthers, thereafter erect, not connivent, terete and gradually tapering, their apices acute and somewhat divergent; dorsal horns 3·5 mm. long, erect, similar to the outer.

Follicles fusiform, up to 10 cm. long, glaucous green with purple-brown spots and a rather obtuse apex.

S. choanantha is an altogether remarkable species, both in its habit of growth and in its singular flowers. The long, funnel-shaped corolla-tube reminds one of *Huernia* but the corona clearly places it in the genus *Stapelia*. Even so, the corona of this new species is very different from all other members of that genus. The outer corona somewhat resembles that of *S. revoluta* Mass. from which, however, it differs in that the lobes are much longer than they are wide and in that they are deeply grooved on the upper surface. The inner corona lobes, with their two long, terete, erect horns, seem to differ from those of all other known species of *Stapelia*. *S. choanantha* is one more example of the great versatility met with in the Stapelieae. It does not appear to fit into any of the sections as enumerated by White and Sloane in *The Stapelieae* 411–428 (1937). It should be placed in a section by itself.

Our species was discovered in September, 1962, by Messrs. P. C. H. Salter, A. Möller and Bruce Ramsey on the upper, eastern slopes of the Huis River Pass, West of Calitzdorp in the Cape Province at an altitude of approx. 3,000 ft. in an area characterised by rather high summer temperatures and an annual rainfall of 250 mm. These three young naturalists observed several plants all of which were growing from extremely narrow ledges or crevices on the vertical and largely unscalable cliff face in a narrow, well-wooded ravine. The stems, up to two metres long, were quite pendent, the few lateral stems emitted

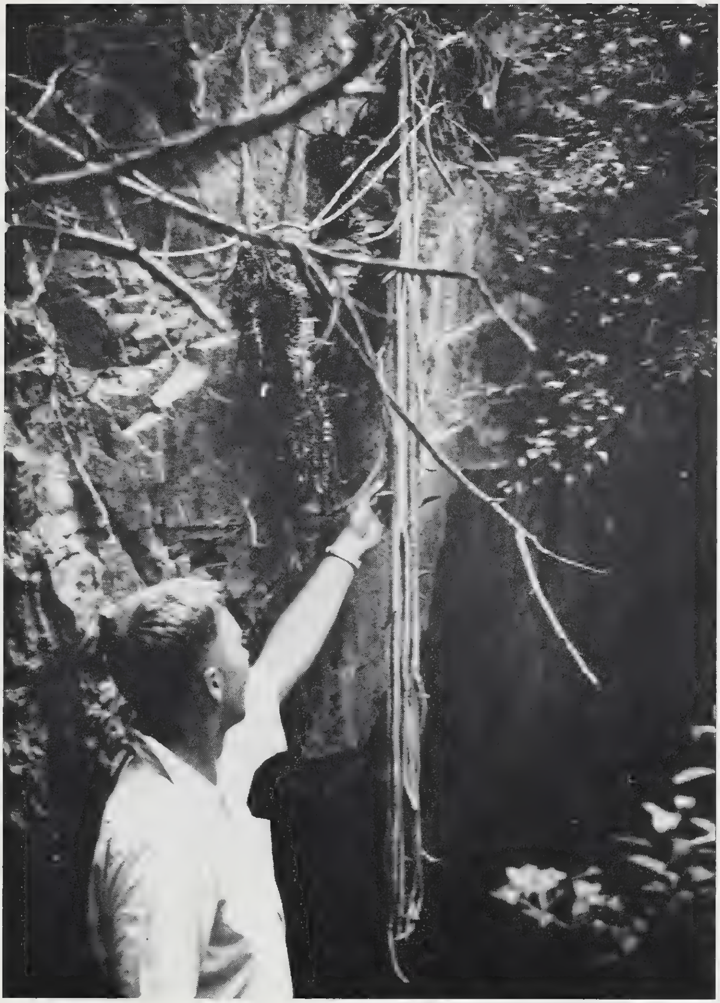

PLATE XVIII

Stapelia choanantha Lavranos et Hall in habitat, with Mr. Bruce Ramsey

Photo: Alfred Möller.

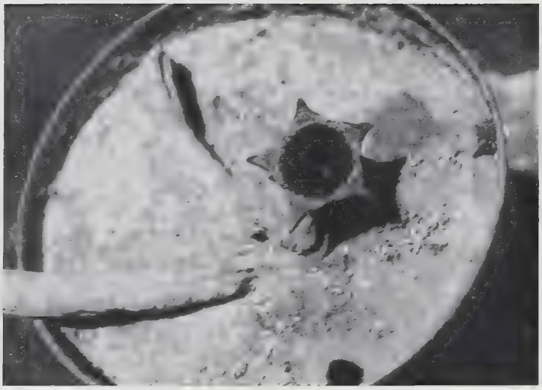

FIG. 1.

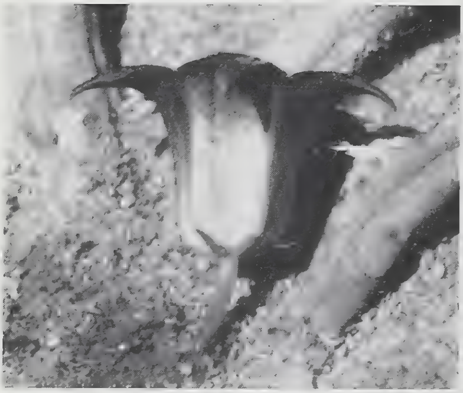

FIG. 2.

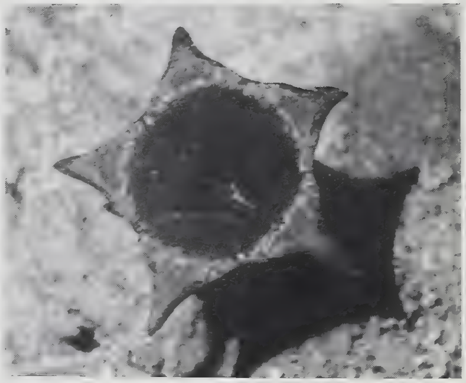

FIG. 3.

PLATE XIX

Stapelia choanantha Lavranos et Hall

FIG. 1. Natural size.
FIG. 2. app. x 2½.
FIG. 3. app. x 2½.

Photo: J. Lavranos.

irregularly from the older stems also hung parallel with them. The plants were not in flower and a second visit a year later by two of the original party was equally unsuccessful. A few days after their first visit Mr. Salter kindly brought a representative long stem to Kirstenbosch which immediately aroused Hall's interest and in December, 1962, Hall and Col. R. D. Bayliss, acting on brief directions from Salter, visited the same ravine where, at a lower altitude than the original specimens were seen, two small plants were found. Unlike the other these grew under small shrubs on a sloping cliff in shallow soil and debris, the many small stems all pendent and often subterranean, the nature of the surroundings preventing them from reaching a sheer cliff face. Material from these two plants was brought to Kirstenbosch where they flowered 10 months later, and it is on these that the present description is based.

The type locality was re-visited by Hall and Bayliss in Dec. 1963 and they were joined there by Möller and Ramsey who had motored that morning from Mossel Bay to make certain they would see the original plants. These proved to be about 300 ft. higher up the ravine than the smaller plants' locality and further material was obtained with no little difficulty owing to their peculiar situation. One of the plants measured 6½ ft. (see Plate XVIII). A second plant examined was more profusely branched with a maximum length of 4½ ft., its stems stouter and more mottled, evidently younger and in better health. It was noted that, even at noon on that mid-summer's day, the vertical rays of the sun barely reached these plants. All the branches bore the scars of old flowering peduncles and these were confined to the first inch of growth since none have been observed over any other portions of the stems regardless of length. It would seem, therefore, that each stem flowers once only and does this in its earliest stages of growth. This is certainly borne out by the plants in cultivation at Kirstenbosch for more than a year, each new stem producing flowering peduncles before it is an inch in length, many of which, however, atrophy before they are fully developed. Furthermore, these new stems all curve noticeably downwards and soon become subterranean in conventional culture.

It is possible that these cliff dwellers with their very singular growth form are but aberrant specimens which have survived their seemingly precarious foothold on the sheer cliff faces, and have lived to a great age, though the long stems reveal little evidence to aid in calculating annual growth. Perhaps further exploration on the higher levels will reveal more conventional growth forms but the terrain in that area is largely very dense karroid scrub, *Portulacaria afra* (L.) Jacq. being dominant here. Many similar areas in this part of the country, with their impenetrable bush and steep cliffs, would oppose considerable difficulties to more thorough exploration.

The authors are much indebted to Messrs. P. C. H. Salter, A. Möller and Bruce Ramsey for drawing their attention to this singular species, for living material and information regarding its mode of occurrence and its habitat. They furthermore wish to thank Mr. Möller and Mr. Ramsey for guiding H. Hall and Col. Bayliss to the higher levels where they made their original discovery. They finally express their appreciation to Mr. Möller for his permission to use the habitat photograph which appears herewith.

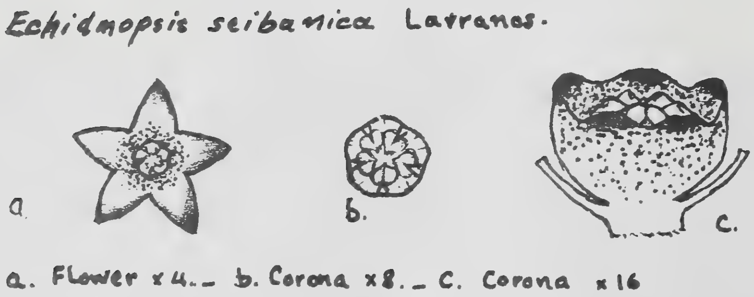
Echidnopsis seibanica Lavranos.
a
b.
c.
a. Flower x 4.- b. Corona x 8.- C. Corona x 16

Illustration of *Echidnopsis seibanica* Lavranos to accompany article on "New Stapeliae from Southern Arabia" by J. Lavranos. (*Journ. S.Af. Bot.*, 30, 2, 88–91)

THE IDENTITY OF STREPTOCARPUS LUTEUS C.B.Cl.

O. M. Hilliard

(*Bews Botanical Laboratories, University of Natal*)

(With Plate XX)

The identities of *S. parviflorus* Hook. f., *S. parviflorus* E. Mey. and *S. luteus* C.B. Cl. were confused until Burtt (1939) partly elucidated the problem by showing *S. parviflorus* Hook. f. to be the valid name for the species from Woodbush in the Pietersburg district of the Transvaal. The name *S. meyeri* B. L. Burtt [*S. parviflorus* E. Mey. ex C.B. Cl.] was created for the species from the Eastern Cape.

Clarke (1883) based his description of *S. luteus* on two specimens, *Nelson* 378 from Houtbosch (Woodbush), Transvaal, and *Gerrard* 1979 from "a cascade of the Tugela river", Natal. Burtt (1939) designated *Nelson* 378 as the lectotype of *S. luteus* because he did not consider Gerrard's specimen adequate for certain determination. He then reduced *S. luteus* to a synonym of *S. parviflorus* Hook. f.

During an investigation of the genus *Streptocarpus* in Natal, very large populations of a species were found in Ngome forest in the Ngotshe district of Natal. *Gerrard* 1979 from Kew and from Trinity College, Dublin, was examined and a flower from the Dublin material was dissected. It matched perfectly the flowers of the species from Ngome forest.

Specimens of *S. parviflorus* from Woodbush, *S. meyeri* from Engcobo, Transkei, and Queenstown, Cape, and Gerrard's plant from Ngome have been grown together and the three species are distinct. They differ in shape, size and markings of the corolla (see fig.) and in the leaves, which in *S. meyeri* are small (up to 150 mm.), almost villous, grey-green and prostrate, and in the other two species larger (up to 600 mm.), pilose, light green and suberect. Their distribution also differs. *S. meyeri* is widespread in the Eastern Cape, *S. parviflorus* is restricted to the mountains of the north-eastern Transvaal, and the third species is known only from the Ngome area of Natal and from Gerrard's perplexing locality.*

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*Gerrard gave the locality of his specimen as "a cascade of the Tugela river". This is probably an error, as nowhere between 500 and 4,000 ft. does the Tugela flow through terrain providing a suitable habitat for this species, and above and below this altitude it is unlikely to be found. Gerrard collected *S. fanniniae* and *S. grandis* at Ngome (Ingoma). It is difficult to believe that he overlooked the commonest *Streptocarpus* species there, growing and flowering side by side with *S. fanniniae*. It is possibly significant that his specimen of the latter bears the number 1980.

Examination of Hooker's (1882) plate and description of S. *parviflorus* leaves one in agreement with Burtt (1939) that this is the Woodbush plant. Now that Gerrard's plant has been recollected, it is apparent that the name *S. luteus* was based on two different elements. Of these, Burtt (1939) selected *Nelson* 378 as the lectotype of *S. luteus*. The name *S. candidus* O. M. Hilliard is proposed for the Natal plant.

Streptocarpus candidus O. M. Hilliard sp. nov., *S. luteus* C.B. Cl. p.p. apud DC. Monog. Phan. 5: 153 (1883) et apud Dyer, Fl.Cap.4 (2): 445 (1904), *S. parvifloro* Hook. f. affinis, sed dissimilis maxime mensura, forma et notis corollae.

Herba acaulis, rosulata, perennis. *Folia* plurima suberecta ad 600 × 200 mm., crenata, apice obtusa, ima parte cuneata in petiolum decurrente, viridia, pilosa, petiolus ad 70 × 13 mm., aut viridis aut rufulus, pilosus. *Inflorescentia* cymosa, plures continuo a petiolo, flores multi quorum plures simul expansi. *Pedunculus* ad 300 mm. longus, viridis, glandularis-pilosus. *Bracteae* ellipticae, ad 3 × 1·5 mm., virides, pilosae. *Flos* c. 40 mm. longus, melle adoratus. *Pediculus* c. 13 mm. longus, in longitudinem ad 20 mm. in fructu crescens, viridis, glandularis. *Calyx* quinque in partes divisa, lobi lanceolati, 5 × 1 mm., virides, glandulares-pilosi. *Corolla* labris duobus; tubus cylindratus, paene rectus, 25 mm. longus, 10 mm. diam., albus, glandularis; limbus rectus fere, lobi superiores divergentes, suborbiculares, 10 × 9 mm., albi, paene glabri; labrum inferius 15 mm. longum, lobi suborbiculares, 9 × 10 mm., albi, glabri abaxiale, glandulares adaxiale, ima pars labri inferioris duobus ianthinis V's invertis et nota lata lurida patens in imo tubo corollae, variis coloribus lineata et ianthino maculata. *Stamina* 5, fertilia 2, filamenta inserta in tertia parte corollae tubi, 8 mm. longa, crassa et torta, glandularia in apice; antherorum lobi confluentes, 2 mm. longi, albi, ianthini ubi maturescunt; staminodia 3, posteriora minima, lateralia 4 mm. longa, alba. *Ovarium* 9 mm. longum, viride, glandulare; stylus 6 mm. longus, compressus a dorso, albus, glandularis; stigma inaequalis canalis papillosa orbiculata; capsula duarum valvarum tortuose complicatarum, ad 70 mm. longa, 2·5 mm. diam.

CITATIONS: NATAL, "a cascade of the Tugela river" *Gerrard and M'Ken* 1979, K, TRIN COL; Ngotshe dist., Ngome Forest, *Gerstner* 4564, KIR; Ngome bush, *Gerstner* 3257A, PRE; Ngome Forest, *Gerstner* s.n., PRE 29185; 7 miles W. of Ngome, forest at top of S.-facing krantz, *L. E. Codd* 9574, PRE; Ngome, *J. D. Scott* s.n. PRE; Ngome Forest, c. 3,500 ft., *Hilliard* 863, NU, HOLOTYPE.

Herb perennial, rosulate, acaulescent. *Leaves* numerous, suberect, up to 600 × 200 mm., crenate, apex obtuse, base cuneate, decurrent on petiole, green, pilose; petiole up to 70 mm. long, 13 mm. in diam., green or reddish brown, pilose. *Inflorescence* cymose, several in succession from petiole, flowers numerous, several expanded simultaneously. *Peduncle* up to 300 mm. long,

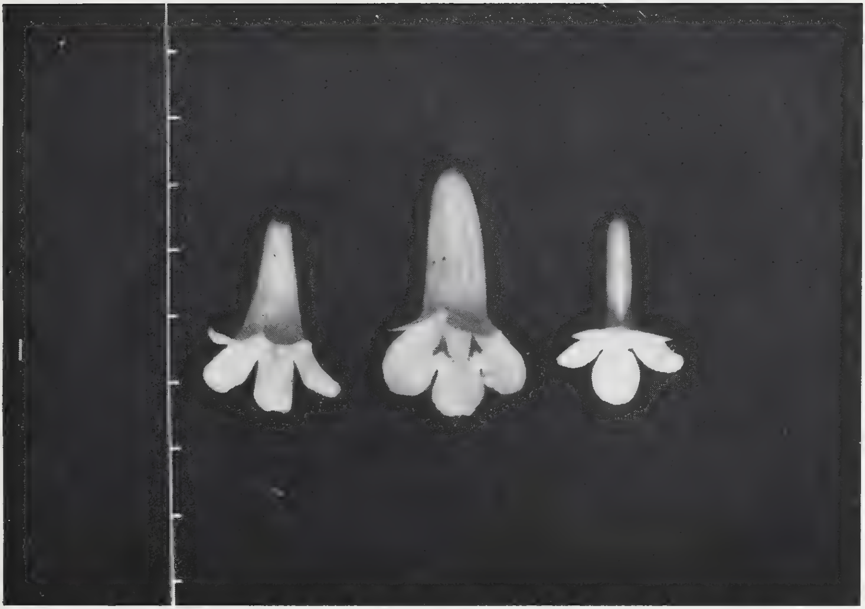

PLATE XX

(From left to right): *Streptocarpus parviflorus*, *S. luteus*, *S. meyeri*.

green, glandular-pilose. *Bracts* elliptic, up to 3 × 1·5 mm., green, pilose. *Flower* c. 40 mm. long, honey-scented. *Pedicel* c. 13 mm. long elongating to 20 mm. in fruit, green, glandular. *Calyx* 5-partite, lobes lanceolate, 5 × 1 mm., green, glandular-pilose. *Corolla* bilabiate, tube subcylindric, almost straight, 25 mm. long, 10 mm. in diam., white, glandular; limb almost straight, upper lobes divergent, suborbicular, 10 × 9 mm., white, almost glabrous; lower lip 15 mm. long, lobes suborbicular, 9 × 10 mm., white, glabrous abaxially, glandular adaxially, base of lower lip with two violet-blue inverted V's and a broad, very pale yellow stripe extending along floor of corolla tube, stripe streaked and spotted violet-blue. *Stamens* 5, fertile 2, filaments inserted one third up corolla tube, 8 mm. long, thick and twisted, glandular apically; anther lobes confluent, 2 mm. long, white, violet-blue at maturity; staminodes 3, posterior minute, laterals 4 mm. long, white. *Ovary* 9 mm. long, green, glandular; style 6 mm. long, dorsally compressed, white, glandular; stigma an asymmetrical, grooved, papillose disc; capsule of 2 spirally twisted valves, up to 70 mm. long, 2·5 mm. in diam.

Flowering period Nov. to Feb.

S. candidus occurs in large populations in Ngome forest, on earth banks, along stream banks and springlines and epiphytic on trees. It is a handsome plant showing affinity with *S. parviflorus*, which species it resembles in habit, but from which it may readily be distinguished by the characters given elsewhere in this paper. It could also conceivably be confused with *S. fanniniae*, but the branching, rooting "petioles" of that species are distinctive as is the tubular corolla with two raised keels, sometimes replaced by parallel stripes, on the floor of the tube.

Key to the Species

1.	Corolla tube cylindric, c. 4·5 mm. in diam. in throat	*S. meyeri*
	Corolla tube subcylindric to infundibuliform, 8—10 mm. in diam. in throat	2.
2.	Corolla tube subcylindric, flower c. 40 mm. long	*S. candidus*
	Corolla tube narrowly infundibuliform, flower c. 30 mm. long ..	*S. parviflorus*

Herbarium Abbreviations

K	Herbarium of the Royal Botanic Gardens, Kew, Surrey, England.
KIR	Compton Herbarium, Kirstenbosch, Newlands, Cape.
NU	University of Natal, Pietermaritzburg, Natal.
PRE	Botanical Research Institute, Pretoria, Transvaal.
TRIN COL	Trinity College, Dublin, Eire.

ACKNOWLEDGMENTS

The Directors of the Herbaria cited above are thanked for sending specimens on loan to the University of Natal.

The author is particularly indebted to Mrs. A. Batten and Mr. L. F. Gibson for living material of *S. meyeri* and to Mr. F. Farquharson and Mr. T. Schofield for living material of *S. parviflorus*, and to Miss J. E. Cheesman and members of the staff of the Dept. of Classics, Univ. Natal for Latin translation.

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NOTES ON MESEMBRYANTHEMUM AND ALLIED GENERA

H. M. L. Bolus

Conophytum stevens-jonesianum L. Bol. sp. nov. (*Cataphracta*).—Plantae 3 visae, 5—8 cm. diam., medio ad 2 cm. alto; vaginae persistentes anni prioris, subrubre brunneae, inferne longitudinaliter plicatae, apicibus planis circumscissis; corpuscula late obconica, viridia, apice punctato, punctis saturate viridibus, in siccis fere albis, ore depresso, 2 mm. longo, fossis terminalibus profundissimis, ad 1 cm. longa diametroque; pedunculi 4—5 mm. longi; bracteae basales, obtusissimae vel subtruncatae, ca. 1·5 mm. longae, lobis vaginam aequantibus, sinu lato; receptaculum subglobosum, ad 2 mm. diam.; calyx herbaceus, sat conspicue papillatus, rubre brunneus, 4 mm. longus, tubo 2 mm. longo, segmentis obtusis, subaequilongis, marginibus angustissimis; corolla ad 8 mm. longa, tubo albo, 4 mm. longo, segmentis ca. 18, ca. 3-seriatis, laxis, obtusis vel acutis, cupreis, saepius ad 0·5 mm. latis; stamina pauca, e parum supra basim corollae adnata, 3—4-seriata, fere omnia exserta, filamentis albis, antheris primum fere ad 2 mm. longis, polline luteo; discus conspicuus, e segmentis ca. 10, truncatis compositus; ovarium late conice elevatum, altitudinem disci attingens vel leviter excedens; stylus nullus; stigmata 4, ad 2·5 mm. longa.

Cape Province; Namaqualand; Anenous Pass, June 1962, *H. Hall* 2432. N.B.G. 577/62. Fl. Apr. 1964.*

Mr. Hall writes: "This locality is the new Anenous Pass which follows the track of the defunct railroad through those mountains. It is several miles from the old Pass. I have explored the almost bare granite slopes of this Pass many times, but had never seen this species before 1962. An unusual feature is the manner in which the old skins rupture so neatly around the rim and readily lift off, rather like the metallic tops of milk bottles! No other member of the *Cataphracta* known to me sheds its old skins in this manner. The flowers even at midnight are not fully expanded."

This species is named after Mr. W. Stevens-Jones who has shared Mr. Hall's devotion to this genus for many years.

The following "Notes", which appeared in October 1958 in The Cactus and Succulent Journal of Great Britain (Vol. 20: 82—85), are being reprinted here with the gracious assent of the two Editors, Mr. E. Shurly and Professor H. B. Rycroft. In this way they will be included in the series of "Notes" which have been published continuously in this Journal since July 1959, and which are destined to form a fourth part of the work bearing the title given above.

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*Note: The type specimens are in the Bolus Herbarium, University of Cape Town, Rondebosch.

By the courtesy of the Director of the Botanical Department of the Royal Natural History Museum in Stockholm, I have recently had the privilege of examining the one hundred and thirty-five sheets of *Mesembryanthemaceae* in the Sonder Herbarium at Stockholm. Among them is a single plant of the type of *M. fimbriatum* Sond., published in 1862 (Flor. Cap. 11:393), collected by Zeyher near the Gamka River in May, 1840, when he and Burke, who also got it, were on an expedition to the north together. This I had not seen before and it was a great moment, after some fifty years of making notes on members of this Family, when I immediately recognised it as being an early stage in the season's growth of *M. pygmaeum* Haw., published in 1819 and now known as **Ruschia pygmaea** (Haw.) Schwant. The mists that have obscured *Conophytum fimbriatum* (Sond.) N. E. Br. since 1922, when the new combination was made, were cleared away and with them vanished this combination, which proves to have been based on a plant quite distinct from *M. fimbriatum* Sond. N. E. Brown writes (Gard. Chron. 1922, p. 214); "The gland-dotted flowers distinguish this from any other species (of *Conophytum*) known to me. Sonder describes the species as glabrous, from specimens collected by Zeyher. I have not seen Zeyher's specimens, from which Sonder described, but as Burke and Zeyher travelled together, and in most cases collected the same species, the specimens collected by Burke at the same locality are probably identical with those of Zeyher and are decidedly minutely puberulous, as in Zeyher 693, which Sonder wrongly quotes as being *M. minutum* Haw." The fact that both Zeyher 693 and Burke are quoted in his description proves that Brown considered them identical, but there seems to be no justification for thinking these two corresponding collections are "probably identical" with the glabrous type of *M. fimbriatum* Sond. I have not seen Burke's specimens and the one plant of Zeyher 693 in the Sonder Herbarium is devoid of flower and fruit. It appears to me to be much more than "minutely" puberulous, suggesting a drought-stricken form of an undescribed pubescent **Gibbaeum** rather than of a **Conophytum.**

Burke, in his "Journal," published in 1845 in Hooker's London Journal of Botany (Vol. IV: p. 648), writes of their sufferings in the severe drought then prevailing and says "No vegetation could be descried but a scanty growth of *Mesembryanthema*." (Burke gives June 28th as the day spent at "Gamtka.") Whatever further research may reveal regarding the genus of this intriguing plant, it will require a new specific name, unless it turns out to be a species already described. In the present uncertainty, it seems best to regard it as insufficiently known both generically and specifically, until some enthusiast is urged to make a special search for it and succeeds in finding it.

It may be noted here that Marloth's amended description of *M. fimbriatum* Sond., published in the Transactions of the Royal Society of South Africa (Vol. I: 406) refers wholly to a collection of **Conophytum saxetanum** N. E. Br. from

Luderitzbucht—a far cry to the Gamka River, which rises in the Nieuwveld Mts. near Beaufort West, and follows a course between this town and Prince Albert before it joins the tributaries to form the Gouritz River flowing south into the Indian Ocean.

It also took us a long time in South Africa to discover the whole of **Ruschia pygmaea,** whose history may be briefly given. It was raised at Kew in 1818 from seed sent by Bowie, its first recorded collector, but never flowered, and all we know of the type consists of Haworth's description and an unpublished coloured drawing in the Kew Herbarium representing vegetative growth, which, allowing for differences due to cultivation, matches the wild material at this stage of its growth. Haworth considered it was nearest *M. mucronatum* Haw., and the two species are still correctly maintained in the section *Microphylla.* The next collections were those of Burke and Zeyher (Zeyher's is the only one quoted by Sonder for *M. fimbriatum*), lacking any remains of flower or fruit of the previous year's growth. Burke's is in the state of complete rest and in Zeyher's the young growth is still enclosed in the resting sheath, but just visible through the gaps of the latter's deeply "lacerate-fimbriate" upper portion. Then Rehmann got it in the same condition as Burke's in the Karoo, north of the Hex River Pass, so that up to this date neither flower nor fruit was recorded. It was only in August, 1905, when the British Association met in South Africa for the first time, that one of its members, R. H. Yapp, found it growing freely at Matjesfontein in full flower. Later, to complete the cycle, fruiting specimens were obtained in the same locality. It is fervently hoped that it will take a much shorter time to determine, from complete living material, the genus of Zeyher 693.

Another type collected by Zeyher and seen for the first time, *M. monticolum* Sond., also discloses an error—in this case my own. For *M. bifoliatum* L. Bol., described in 1922, from what we now know to have been merely an early stage of the inflorescence, is identical with a corresponding portion of the type, which is represented by a flowering branch with only a short inflorescence and a few of the basal foliage leaves. When complete plants of several years' growth were collected by H. Hall at Komkans in Namaqualand in 1954 and 1955, and could be identified with the type, there was great joy among us. For in the interval, about a century, between the two dates (Zeyher died in 1858) no other complete collection had been recorded, and its curious inflorescence, unique in this Family, was fully revealed for the first time. This character alone justifies its having been raised to generic rank and been worthily called **Ottosonderia*** after Dr. Otto Wilhelm Sonder, who was courageous enough to

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NOTE: The type specimens of all new species described in this paper are in the Bolus Herbarium, University of Cape Town, Rondebosch, except that of *Drosanthemum insolitum* which is in the Royal Natural History Museum, Stockholm.

* Mesem. 111: 292

undertake the task of bringing Haworth's work up to date for the Flora Capensis, as far as this could be done with usually dried material only at his disposal, and the many insufficiently known species and confusion of names that existed to perplex him. The illustration shows how the inflorescence continues to branch year after year, the normal pattern being one flower to a branchlet with a bud in each axil for the next year's growth. If, therefore, all the flowers developed normally (without abortion or insect-raid) the second year's growth of the original axillary buds would be two flowers and the third year's four flowers and so on. After several years the branching inflorescence becomes a rigid cyme shaped like an upside-down pyramid.

In the same year as his rediscovery of **Ottosonderia monticola,** a second species, **O. obtusa,** was discovered by H. Hall farther north at Walle Kraal. Both species have flowered at Kirstenbosch.

Another puzzle solved in revising the Sonder Herbarium deals with Ecklon 2069, collected between "Hauwhoek and Caledon" in 1858 and represented by one plant. Sonder writes of it: "In habit very near *M. micans,*" but identifies it with *M. hispidum* L—now **Drosanthemum hispidum** (L.) Schwant., which is a very different plant and quite unknown from the Caledon Division. Ecklon's label reads "flores crocei" (those of **D. hispidum** being rose-purple), and at a glance they may be recognised as belonging to the group of which **D. micans** (L.) Schwant. is the earliest known species. For the leaves and sepals are similar, yellow petals often occur in the section, and the black staminodes are as numerous and conspicuous as they are in **D. micans.** But instead of the branches and peduncles being rough, as they are in the rest of this secton (*Aspericaulia*), they are distinctly hispid, though not so conspicuously as is usual in the section *Hispida.* Perhaps it was this character only which led to Sonder's placing it under **D. hispidum.** Another distinguishing mark to be observed is the globose shape of the papillae on the receptacle, these being elongated in all the other closely allied species. These two characteristics, and there are probably more to be seen in the living plant, separate it from all the other known species in the section having yellow petals and copious black staminodes and I, therefore, propose to describe it as **Drosanthemum insolitum,** the unusual **Drosanthemum,** because of its hispid branches and peduncles and its globosely papillate receptacle. The only plant seen is evidently flowering in its first year, judging by the slender root and the absence of any remains of a previous year's growth, and it is less robust than **D. micans.**

Drosanthemum insolitum L. Bol. sp. nov. (*Aspericaulia-Speciosa*).

Planta sicca unica visa, erecta gracilis, laxe ramosa, 15 cm. alta; folia erecta vel ascendentia, apice recurva, crebre et sat inconspicue papillata, 1—1·4 cm. longa, ad 2 mm. diam.; pedunculi hispidi, 3—7 cm. longi; sepala subaequalia, 5 mm. longa; petala "crocea," ad 1·6 cm. longa, ad 2 mm. lata; staminodia atrata conspicua crebra, stamina pallida aequantia vel paullo superantia—cetera non examinata.

Cape Prov.; in dit. Caledon; inter Houw Hoek et Caledon, Nov. 1858. *Ecklon* 2069.

Cephalophyllum vanheerdei L. Bol. sp. nov. This genus, containing more than sixty species, of which two at least are among the plant-aristocrats in that their names were written by the great Linnaeus in the book "Species Plantarum," where plants in 1753 were given a double name (generic and specific) for the first time in the history of botany. Some of the most beautiful of the flowers in this vast Family are to found in this genus, and the present species, named after its discoverer, P. van Heerde, may take its place in the front rank. There is probably no one today who knows Namaqualand and its flora in the same way as Mr. van Heerde does. For he has lived in the very heart of it, at Springbok, nearly all his life, making frequent excursions into remote and less known areas, collecting, distributing and growing a very large number of species—many of these new. The genus **Vanheerdea** is named after him (I regret having misspelt it in the first instance *Vanheerdia*).

The inflorescence of *C. vanheerdei* is copiously branched and a plant with its procumbent branches, each terminating in as many as sixteen flowers, and a prospect of more to come, must be a beautiful sight. One branch only was received, with immature fruit, buds in all stages and fully developed flowers. One of the buds opened in water and, on the second day of opening, measured 10 cm. in diameter, except for **C. spongiosum** which attains a diameter of 11·5 cm. in cultivation, the largest flower hitherto recorded in the genus. The petals, one series or with two or three interior ones a little shorter in addition, are laxly set, having a slight gap between them, and are a clear bright yellow throughout. In habit of growth it is among the more robust species, but much less rigid than **C. cupreum** and the giant **C. spongiosum.**

Ramus floriferus cum floribus 21 cm. longus, internodiis 1·5—2 cm. longis, ad 7 mm. diam., decumbens, compactus ob gemmas axillares bene evolutas; folia saepius erecta, matura subteretia, supra plana vel superne leviter convexa angustataque, lat. visa apice rotundata, glauce viridia, levia, 3—8·5 cm. longa, 5—10 mm. diam.; inflorescentia laxe 4-ramosa, 16-flora; pedunculi inferne patentes, superne sursum curvati, 3—6·5 cm. longi; bracteae 2—2·5 cm., rarissime ad 4·5 cm., longae, vagina ad 1 cm. longa; receptaculum breviter crateriforme, ad 4 mm., longum, ad 1 cm. diam; sepala 5, exteriora superne subulata, obtusa, interiora apice compressa, 1—1·7 cm. longa, basi 4—6 mm. lata; petala 1—3-seriata, laxa, interiora pauca, inferne e medio angustata, obtusa vel inconspicue emarginata, laete lutea, saepius 4—5 cm. longa, 2—3 mm. lata; filamenta aurea, 3—6 mm. longa, antheris pollineque pallidis;

ovarium supra per 2 mm. gradatim elevatum, lobis apicem versus compressis; stigmata 11—12, 4 mm. longa.

Cape Province; Namaqualand; "on one of the Umdaus ridges, about 15 miles on the Steinkopf-Klipfontein Rd.," Jul. 14, 1958, *P. van Heerde* (Bolus Herbarium 26574).

Another interesting plant collected by H. Hall in Sept., 1955 at Komkans is *Cephalophyllum primulinum*, growing "on muddy banks in small river bed; flowers pale yellow." This is the only record since the type was collected in 1910 by Pearson and Pillans on one of the Percy Sladen Memorial Expeditions which yielded so many new discoveries. It was still growing freely in Mr. Pillan's garden twelve years later, when the description was made. Mr. Hall's specimens were, therefore, the first wild ones I had seen.

We often think there is as much, or even more, of a thrill in rediscovering old species, or completing the descriptions of the insufficiently described ones, than in discovering new ones. At any rate, yesterday (Aug. 9th) was a red letter day when Mr. Hall brought a flowering branch with one flower of **Schlechteranthus maximiliani** Schwant., described without flowers, from a plant he got at Oograbies, about twelve miles east of Port Nolloth, not far from the type locality. This so exactly matched the portion of the type Dr. Schwantes had presented to the Bolus Herbarium that we felt confident the determination was correct, and Mr. Hall set himself in earnest to induce it to flower, placing plants in different parts of the garden in the hope of finding the most suitable conditions. He at last saw indications of the earliest signs of a flower-bud and for several weeks has carefully guarded it from pests and other accidents. Indeed it proved to be only a tiny modest mouse after such a mountain of labour, but precious and cherished because of its interest to science. The following notes were made; flower solitary with no indication of a bud in the axils of the bracts, in general appearance closely resembling a typical **Ruschia** flower: peduncle 5 mm. long, compressed in the lower part which is enclosed in the leaf sheath, bracteated in the middle; bracts unlike the leaves in appearance, concave on the upper surface and clasping the peduncle, margins membranous rose, 6 mm. long, the sheath 3 mm.; receptacle cyathiform (long cup-shaped), 4 mm. long, 2·5 mm. in diameter; sepals 6, the sixth aborted and chiefly consisting of a membrane (probably the normal number is 5), 2·5—4 mm. long; petals in one series, arranged in five groups (as often occurs in **Ruschia**), not narrowed downwards, obtuse purple-rose, 5 mm. long, up to 0·5 mm. broad; staminodes appressed to the conically collected stamens and slightly exceeding them, acute, purple-rose; stamens rather few, filaments pallid in the lower part, deep rose in the upper, papillate a little above the base; nectary anular, rather inconspicuous, denticulate; ovary semi-globosely elevated, the lobes convex; stigmas 9, very narrowly subulate, brownish purple at the apex, 1·5 mm. long; capsule 10-locular.

Conophytum intermedium L. Bol. sp. nov. (*Derenbergia-Saxetana*). Plantae plures visae, e 12—20 corpusculis compositae; vaginae persistentes papyraceae, inferne politae pallideque brunneae; corpuscula obovate cuneata, leviter compressa, supra visa elliptica, levia, glabra sinon circa orem inconspicue ciliata, pallide viridia, inconspicue sparse punctata, 1—1·5 cm. longa, prope apicem 5—7 mm. diam., lobis 0·5—1·5 mm. longis, divergentibus, marginibus carinisque interdum rubre lineatis; pedunculus ad 9 mm. longus; calyx non bene visus, marcescens, segmentis 4 (?) subaequilongis; corolla 5—7 mm. longa, segmentis 1—2-seriatis, obtusis vel rarius acutis, rubre cupreis, 1·5—2 mm. longis, ad 0·5 mm. latis; stamina 11—13, 2-seriata, omnia exserta, antheris luteis, 1 mm. longis, apicem corollae fere attingentibus; discus conspicuus, segmentis ca 9—12, obtusis; ovarium concavum, medio tantum conice elevatum; stylus 1 mm. longus; stigmata 4, apicem corollae attingentia vel rarius superantia, saepius ad 4·5 mm. longa.

Cape Province; Namaqualand; Richtersveld, Noisabis, Mart. 1958, *H. Hall* 1324. Fl. Maio 6—26th, 1958, Kirstenbosch, N.B.G. 123/58.

Sic nominatum quia corpuscula subgenus *Derenbergia* simulantia, et flores *Euconophytum* simulantes, itaque inter haec subgenera intermedium est.

Lithops hillii L. Bol. sp. nov. (*Fenestratae-Arubrae*). Planta e corpusculis pluribus composita; corpuscula late obconica, 1·8—2·2 cm. longa, apice, cum rima per 4—5 mm. divergente, 1·9—2·1 cm. diam., lobis 5—9 mm. longis, basi 1—1·2 cm., apice 1·5—1·7 cm. latis, lateribus saturate columbine griseis, fenestra convexa, "insulis" paucis, leviter prominentibus, griseis, punctisque sparsis minutissimis albis ornata, margine exteriore breviter irregulariterque laciniata, interiore integra, punctis sparsis vel aggregatis, minutis nigris ornata; pedunculus 1—1·5 cm. longus, in receptaculum 2—3 mm. longum, ad 5 mm. diam., insensim abeuns; sepala 5, papillata, superne leviter angustata, obtusa, omnia ± marginata, inter minima in genere, 4—6 mm. longa, basi 2—3 mm., vel ad 4 mm., lata; petala 2—3-seriata, inferne e supra medium angustata, obtusa, laete lutea, prope basim alba, ad 1·2 cm. longa, ad 1·75 mm. lata; filamenta alba, ad 6 mm. longa, antheris luteis; ovarium supra planum; stigmata 5, 7 mm. longa.

Cape Province; Namaqualand; Stinkfontein, alt. ca. 3000 ped., Sept., 1956, *L. J. Hill* (Bolus Herb. 26575). Fl. hort. Hill, Maio 1958.

L. geyeri Nel proxime accedit, sed corpusculis brevioribus, diametro majore, floribus minoribus, petalis integris (eis **L. geyeri** conspicue emarginatis), ovarium supra planum (eo **L. geyeri** e margine ad medium gradatim ad 1 mm. elevato), differt.

TWO NEW ALOES FROM SOUTHERN RHODESIA

G. W. Reynolds

(With Plates XXI and XXII)

Aloe ballii Reynolds. Species nova, arcte affinis *A. bellatula* Reynolds (Madagascar) racemis pedicellis floribusque sed non foliis; affinis *A. inyangensis* Christian (Inyanga, S. Rhodesia) foliis distichous carnosis sed non floribus.

Planta parva, succulenta, saepe pendens, caulibus 20—30 cm. longis, (interdum usque 1—1·5 m. longis). *Folia* 8—10, disticha, 20—30 cm. longa, basi 10 mm. lata, sensim attenuata; *supra* canaliculata, viridia, basi maculata *subtus* convexa, basi copiose maculata; marginibus dentibus minutis albidis 2—4 mm. distantibus ciliata, superne inderdum integra.

Inflorescentia simplex, 50—60 cm. longa. *Pedunculus* basi plano-convexus et 5 mm. latus. *Racemus* cylindrico-acuminatus, 12—18 cm. longus, 4 cm. diam., 40—50-floribus. *Bracteae* ovato-acutae, 3 mm. longae, 2 mm. latae, 3—5-nervatae. *Perianthium* aurantiacum, cylindrico-campanulatum, 12—16 mm. longum, basi brevissime stipitatum, circa ovarium 4 mm. diam.; *segmenta exteriora* libera; *interiora* carinata. *Antherae* inclusae. *Stigma* demum non exsertum. *Ovarium* viridulum, 2·5 mm. longum, 1·5 mm. diametro. (Plate XXI).

Southern Rhodesia. Melsetter District, Haroni Gorge at confluence of the Haroni and Chesenga Rivers (South of the Chimanimani Range) Cult. hort. Bullock Bulawayo, fl. 13 Oct. 1963, Bullock 37/1 holotype (SRGH), isotype (K, PRE); cult. Mbabane Swaziland, fl. 9 Feb. 1964, Bullock et Reynolds 10115 (SRGH, PRE, K).

Our most distinctive new species is named after Mr. John Ball of Melsetter, S. Rhodesia, who discovered it flowering in November 1962, in a deep gorge, at the confluence of the Haroni and Chesengu Rivers at the southern end of the Chimanimani Range. This locality is 1¾ miles north-west of Point 74 of the Moçambique—S. Rhodesia border, at an altitude of 1,250 feet.

The following June Mr. Ball and Mr. E. J. Bullock of Bulawayo visited the locality again and collected several plants, but unfortunately no herbarium specimens were prepared, and no photographs taken.

Some plants grown by Mr. Bullock in Bulawayo flowered in October 1963, and some cultivated at Mbabane flowered in January and February 1964. Photographs were then secured, specimens made, and the description was drawn up.

Mr. Bullock found plants in leaf mould and sand amongst tussocks of grass wedged in crevices of large quartzite rocks and on sheer rock faces. He wrote "When the stem is a few inches long it starts sending out its distichous leaves slightly out of line with the previous ones so that the plant develops a twist. When this happens to a plant growing over the edge of a rock face the stem develops a spiral twist. In moist conditions a long 'dead' spiral stem may suspend the viable stem like a spring. From the original growing point to the viable stem the length of this 'dead' part of stem may be up to 150 cm." In cultivation, numerous shoots appear at random along the growing stem, while the inflorescence is produced obliquely to horizontally or obliquely downwards. A striking character of *A. ballii* is its short cylindric-campanulate flowers only 12—16 mm. long, the pedicels being slightly longer. No other aloe species in Africa is known with such flowers, but the Madagascar species *A. bellatula* Reynolds is very closely allied in floral characters only—see this *Journal* 22 : 132 (1956). In leaf clusters and leaf characters they bear no resemblance whatever to each other. In leaf characters only *A. ballii* appears to be nearest allied to some weak forms of *A. inyangensis* Christian.

Description

Plant small, usually pendulous, developing long spirally coiled smooth stems 1—1·5 m. long when hanging down sheer rock faces, the terminal viable portion 20—30 cm. long, 9 mm. diam.

Leaves 8—10, distichous, basally amplexicaul, 20—30 cm. long, 10 mm. broad near base, gradually narrowing to an acute apex; *upper surface* canaliculate, green, with several white or very pale green elongated spots scattered in lower quarter; *lower surface* convex, green, usually copiously white-spotted near base; *margins* with minute white teeth about 2—4 mm. apart low down, obsolescent upwards.

Inflorescence simple, 50—60 cm. long, produced obliquely to horizontally or obliquely downwards with the raceme sometimes slightly up-turned.

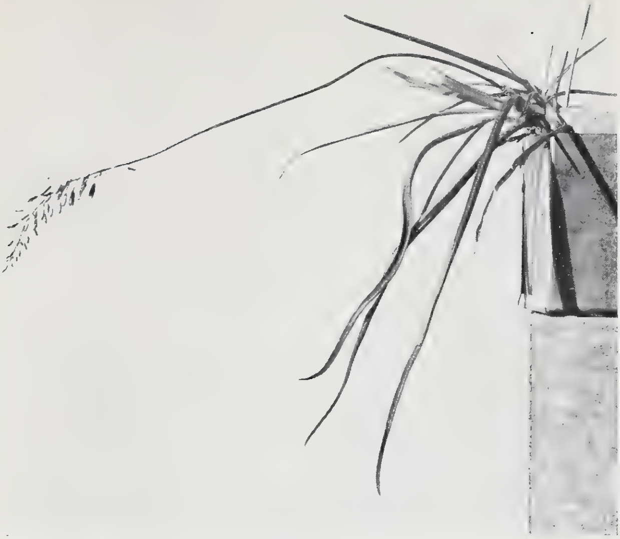
Peduncle basally plano-convex and 5 mm. broad, terete and 3 mm. thick upwards, clothed with a few sterile-bracts that are ovate-acute, 5 mm. long, 3 mm. broad, 3—5-nerved, the racemose portion the colour of the perianth and pedicels.

Raceme cylindric-acuminate, 12—18 cm. long, 4 cm. diam. at base, sublaxly 40—50-flowered, youngest buds erect, open flowers nutant.

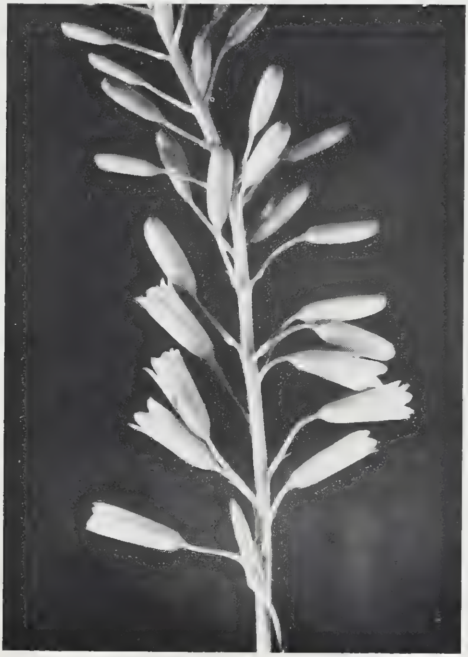
Bracts ovate-acute, 3 mm. long, 2 mm. broad, thin, 3—5-nerved.

Pedicels very slender, 14—20 mm. long, longer than, and the colour of the perianth.

Perianth 12—16 mm. long, cylindric slightly campanulate, flame-scarlet to pale reddish-orange, basally tapering into the pedicel, 4 mm. diam. across the

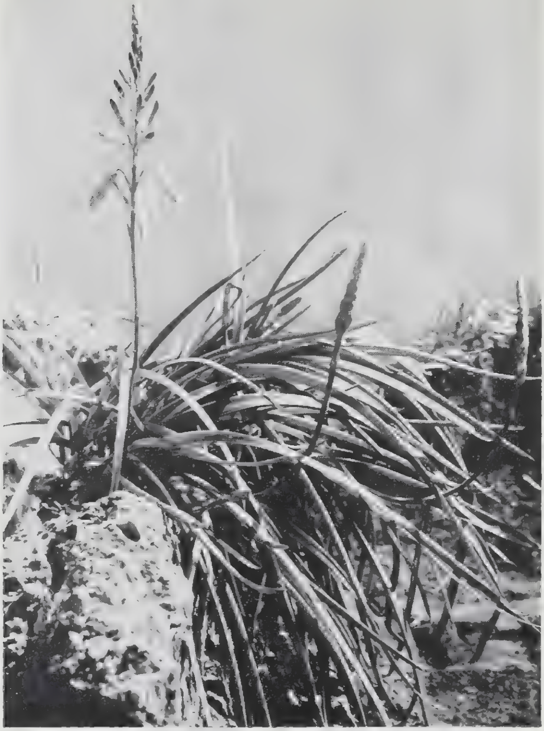


Aloe ballii Reynolds. Plant from the Haroni Gorge, south of the Chimanimani Mts. Melsetter Dist. S. Rhodesia, flowering at Mbabane Swaziland. × 1/7 approx.

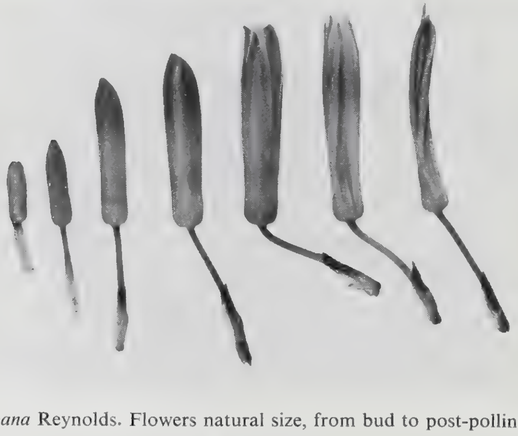


Aloe ballii Reynolds. Portion of raceme, natural size.

Plate XXI



Aloe musapana Reynolds. From Musapa Mtn., 10 miles N. of Melsetter, S. Rhodesia, flowering at Mbabane, Swaziland. Height of inflorescence 35 cm.



Aloe musapana Reynolds. Flowers natural size, from bud to post-pollination stage.

Plate XXII

ovary, enlarging a little to a wide open mouth; *outer segments* free to base, apices slightly spreading; *inner segments* with 3 crowded nerves forming a scarlet keel throughout. *Filaments* almost white, the 3 inner narrower and lengthening before the 3 outer with their *anthers* not exserted. *Stigma* at length not exserted. *Ovary* green, 2·5 mm. long, 1·5 mm. diam.

Aloe musapana Reynolds. Species nova, *A. nyangensis* Christian affinis, bracteis parvis, pedicellis et floribus brevioribus differt.

Planta succulenta, caulibus usque 20 cm. longis. *Folia* c. 10, disticha, patentia vel saepe falcato-decurva, linearia, c. 30 cm. longa, 15 mm. lata; *supra* viridia, canaliculata, immaculata vel interdum maculis paucis sparsis; *subtus* convexa, basi copiose maculata; marginibus dentibus minutis albidis ciliata.

Inflorescentia simplex, c. 30—40 cm. alta. *Racemus* cylindraceo-acuminatus, 15 cm. longus, 6 cm. diam. *Bracteae* ovato-acutae, 10 mm. longae, 6 cm. latae, scariosae, multinervae. *Pedicelli* 20 mm. longi. *Perianthium* coccineum, cylindraceo-trigonum, 28—30 mm. longum, 6 mm. diam.; *segmenta exteriora* libera. *Antherae* 1—2 mm. exsertae. *Stigma* demum 2 mm. exsertum. *Ovarium* 5 mm. longum, 2 mm. diam. (Plate XXII).

SOUTHERN RHODESIA. Melsetter District, Musapa Mountain, 10 miles north of Melsetter, alt. 6,500 ft., cult. Bulawayo, fl. 10 Mar. 1963, E. J. Bullock 36—1, holotype (SRGH); cult. Mbabane, Swaziland, fl. 30 March 1964, Bullock et Reynolds 10092, isotype (PRE, K).

A. musapana is named after the locality where Mr. E. J. Bullock of Bulawayo first found plants in January 1961, namely Musapa Mountain (7,040 ft.) which is 10 miles north of Melsetter and west of the northern end of the Chimanimani Range, in the eastern parts of Southern Rhodesia. Mr. Bullock found plants on northern, north-western and southern sheer rock faces on Musapa Mountain in conditions of full summer and winter sunshine, at an altitude of between 6,250 and 6,750 feet. Plants flower there from March to May.

A. musapana appears to be nearest allied to the weaker forms of *A. inyangensis* Christian from which it differs in having leaves with smaller marginal teeth, a much slenderer peduncle with much smaller sterile-bracts. The youngest buds of *A. musapana* are not at first hidden by large imbricate bracts as they are in *A. inyangensis*, while the bracts are smaller, the pedicels are shorter (20 mm. against 25—30 mm.) and the perianth is also slenderer and shorter i.e. 30 mm. 35—40 mm.

In cultivation, plants increase rather quickly, especially if watered, and flower prolifically.

DESCRIPTION

Plant mostly pendent, with several stems up to 20—30 cm. long, 1 cm. diam., with numerous shoots near base or higher, forming dense groups.

Leaves distichous, about 10, basally amplexicaul, spreading to falcately decurved, linear, gradually narrowing to an acute apex, 15 mm. broad near base, 30—40 cm. long; *upper surface* dark green, canaliculate with or without a few white spots low down; *lower surface* convex, copiously spotted near base, the spots dirty-white, lenticular; *margins* with white cartilaginous teeth that are minute near base, obsolescent upwards.

Inflorescence simple, 30—40 cm. long.

Peduncle rather slender, basally plano-convex and 5 mm. broad, terete and 4 mm. thick upwards, with a few sterile-bracts that are ovate-acute, thin, scarious, brownish, 12 mm. long, 7 mm. broad, many-nerved.

Racemes cylindric-acuminate, 15 cm. long, 6 cm. broad, subdensely flowered, the youngest buds suberect, scarlet with greenish tips, open flowers pendulous, scarlet, pale greenish at mouth.

Bracts ovate-acute, the lowest 10 mm. long, 6 mm. broad at base, thin, scarious, many-nerved.

Pedicels 20 mm. long, slender, the colour of the perianth.

Perianth scarlet, pale green at mouth, cylindric slightly trigonous, 28—30 mm. long, 6 mm. diam., across the ovary, slightly enlarging to the throat; *outer segments* free to base, obscurely 3-nerved, the apices subacute; *inner segments* broader than the outer, thin at the edge, with 3 crowded nerves forming a scarlet keel turning green at the broader apices.

Filaments filiform-flattened, very pale rose, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exserted 1—2 mm. *Stigma* at length exserted 2 mm. *Ovary* pale olive, 5 mm. long, 2 mm. diam.

ACKNOWLEDGMENTS

I am deeply indebted to:

Mr. E. J. Bullock of Bulawayo for considerable assistance in collecting and sending several plants of *A. ballii* and a large clump of *A. musapana* to me, for preparing several herbarium specimens of both species, for copies field notes, for colour photographs and much other invaluable assistance.

Mr. John Ball of Melsetter for hospitality when I visited Melsetter, for conducting me to The Corner, and along the Chimanimanis, and for much help with the Aloes of those regions.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, for photographs and for the facilities of the National Herbarium, Pretoria.

The South African Council for Scientific and Industrial Research for travelling grants that have enabled me to investigate the Aloes in most parts of the continent of Africa.

BOOK REVIEW

FAMILIES OF FLOWERING PLANTS OF SOUTH AFRICA, by Hubert Parkes Riley. University of Kentucky Press, U.S.A. 296 pages with 3 maps and 144 full colour illustrations. Price $14.00.

Professor H. P. Riley head of the department of botany at the University of Kentucky, has visited South Africa several times and is well known as the author of works on genetics and cytogenetics. In his preface to *Families of Flowering Plants of Southern Africa*, he mentions that it was not primarily written for the botanists of Southern Africa themselves, but he hopes that the book might be of some interest to them.

To the South African botanist who is familiar with the indigenous flora, and has repeatedly been assured that it is unique and has come to regard it as something apart, and most plants grown in private gardens as "exotics" and those aliens which have gone rampant and threaten its very existence as "Green-cancers", Professor Riley's book brings the Families of Southern Africa into a refreshingly new perspective. as an integral part of a continental and a world flora, in an American setting. For what South African, botanist or layman tends to think of *Protea* as belonging to the silk-oak family, or *Pacypodium* to the dogbane or periwinkle family?

The author has woven a great amount of information on a number of different aspects of botany, including the chromosome numbers of many of the genera, common names and economic uses, illustrated with three maps and 144 excellent colour pictures, into a work which is both valuable as a reference book to all botanists, as well as an eminently readable one full of interesting and often surprising information to anyone, as he puts it, "whose major concern is Southern Africa in all its aspects".

Its bold headings and excellent print are added recommendations and facilitate its use.

W. F. BARKER.

ITINERARY OF RUDOLF SCHLECHTER'S COLLECTING TRIPS IN SOUTHERN AFRICA

J. P. JESSOP

(*Botanical Research Institute, Pretoria.*)

(With Plates XXIII and XXIV)

During the years 1891 to 1898, Rudolf Schlechter collected somewhat more than twelve thousand specimens in Southern Africa. Many of these specimens were new to science, and much of the area he covered was virtually unknown botanically. The only account of his travels in which collecting numbers and dates are given seems to be that of Loesener (1926). It has long been felt that a list which would help to locate his more vague stations such as Langeberg or Sandfontein, and which would act as a check on the inaccuracies which occur on some of the labels, was needed. Two examples are cited to show the presence of incorrect data on his labels. The first is a set of numbers from Caledon which were cited as being from the Cape Peninsula, possibly because H. Bolus was paying for Peninsula specimens. The other is that he claimed that he had reached and crossed the Limpopo, whereas the itinerary given below shows that this was not possible at the time he mentioned in his article (1895).

As no register has been traced, a number of other sources all based on herbarium sheets have had to be used, and sufficient numbers obtained to give an almost complete itinerary. Each item consists of an unbroken time period, where possible a single locality, and the first and last register number available. The three sources which have provided the data in this article are: First, a long list assembled by N. E. Brown, and made available by the Director of Kew; second, a large number of records accumulated by N. S. Pillans; and finally, numbers were taken from herbarium sheets in the Bolus Herbarium. The completeness of this compilation has been made possible by the staff and students at the Bolus Herbarium, in particular Dr. E. A. C. L. E. Schelpe and Dr. A. V. Hall. A list of numbers of specimens, compiled mainly by S. Schönland, was lent to me by Albany Museum, Grahamstown. Special thanks are also due to the following: The Director of Kew, Dr. F. Markgraf (Director of the Botanic Gardens and Institute for Systematic Botany, Zurich), the Director of the Botanical Institute of the University of Coimbra, the Director of the Natural History Museum (Botanical section) Vienna, the Curator of the

Botanical Gardens and Museum Berlin-Dahlem, and Mr. P. van Heerde of Springbok.

In the list, the collecting numbers up to 1,700 have not been included as they do not follow in chronological order—presumably because Schlechter did not at that stage keep a register. After this there are a few places where specimens are out of order, but there are few breaks in the correlation between chronology and register number.

One of the most difficult aspects of the use of Schlechter's specimens has been the identification of his localities. All names which could be identified, and which are not on either Acocks Vegetation Map of South Africa or the large-scale inlets on the maps in this article or, for Mocambique, in the Times Atlas of the World (1956), are located by reference to places on these maps, where they first occur in the list.

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SCHLECHTER, R., 1895. Aufzählung der von mir auf meiner letzten Reise durch Natal und Transvaal gesammelten Orchidaceen. *Bot. Jahr.* **20** Beiblatt 50 : 20–24.

SCHLECHTER'S ITINERARY

13/12/91	Orange Kloof and Table Mountain. Orange Kloof is in Table Mountain near Constantianek.
15/12/91	Constantiaberg. Constantiaberg is south of Constantianek.
17/12/91	Devils Peak.
19/12/91	Newlands.
20/12/91	Orange Kloof.
21/12/91	Cape Flats.
23/12/91	Camps Bay.
25/12/91	Table Mountain.
27/12/91	Claremont.
1/1/92	Muizenberg Plateau.
6/1/92	Paarl and Dwars River.
9/1/92	Dwars River near Paarl.
10/1/92	Table Mountain.
14/1/92	Klapmuts.
16/1/92	Mountains near Franschhoek.
17/1/92	Constantiaberg and Vlakkenberg. The Vlakkenberg is south of Constantianek.
18/1/92	Rondebosch Common. (Camp Ground).
19/1/92	Kenilworth Flats.
20/1/92	Wynberg Flats.
23/1/92	Near Claremont and Wynberg.
24/1/92	St. Mary's Lake near Newlands, and Newlands Flats.
25/1/92	Kenilworth Flats.
26/1/92	Kenilworth Flats.
29/1/92	Constantiaberg.
31/1/92	Ceres Road and Mostertsberg near Ceres. Ceres Road is now called Wolseley. Mostertsberg is now called Mostertshoek and is south-west of Michell's Pass.
3/2/92	Salt River.
4/2/92	Claremont Flats.
9/2/92	Kenilworth.
13/2/92	Simonstown.
14/2/92	Simonstown.
17/2/92	Between Claremont and Kenilworth.
18/2/92	Claremont Flats.
21/2/92	Near Orange Kloof and Table Mountain above Klaasenbosch. Klaasenbosch is to the east of Constantianek.
23/2/92	Claremont Flats.
26/2/92	Flats between Claremont and False Bay.
3/3/92	Kenilworth and ? Claremont.
7/3/92	Slopes between Claremont and Kenilworth Railway Station.
9/3/92	Claremont, Kenilworth and Wynberg.
10/3/92	Kenilworth.
13/3/92	Table Mountain.
18/3/92	Simonstown and Smitswinkel Bay. Smitswinkel Bay is about six miles south of Simonstown.
20/3/92	Constantiaberg and Table Mountain.
21/3/92	Rondebosch Common. (Camp Ground).
27/3/92	Muizenberg, Rondebosch Common and Rosebank.
3/4/92	Retreat to Muizenberg.
7/4/92	Simonstown.
12/4/92	Near Muizenberg.
17/4/92	Smitswinkel.

18/4/92	Simonstown and Smitswinkel.
2/5/92	Orange Kloof.
8/5/92	Orange Kloof.
15/5/92	Rondebosch Common. (Camp Ground).
29/5/92	Constantiaberg and Hout Bay.
1/6/92	Flats near Wynberg.
5/6/92	Claremont and False Bay.
11/6/92	Lions Rump. Lions Mountain (including Signal Hill and Lions Head) is west of Cape Town.
12/6/92	Constantiaberg and Hout Bay.
13/6/92	? Rondebosch Common. (Camp Ground.)
19/6/92	Near Hout Bay.
26/6/92	Above Orange Kloof.
30/6/92	Lions Mountain and Sea Point.
3/7/92	Wynberg and Simonstown.
5/7/92	False Bay.
6/7/92	Claremont and Wynberg.
10/7/92	Simonsberg.
15–16/7/92	Sir Lowry's Pass.
17/7/92	Rondebosch.
18/7/92	Simonstown.
24/7/92	Constantia and Hout Bay.
25/7/92	Wynberg.
27/7/92	Claremont.
28/7/92	Wynberg.
29/7/92	Claremont.
31/7/92	Retreat and Muizenberg.
7–8/8/92	Muizenberg.
21/8/92	Orange Kloof.
27/8/92	Lion's Mountain.
28/8/92	Rondebosch Common and Wynberg.
29/8/92	Lion's Mountain.
1/9/92	Lion's Mountain.
3/9/92	New Kloof and Tulbagh. The New Kloof is between Gouda and Tulbagh Road.
4/9/92	New Kloof, Tulbagh and Tulbagh Waterfall.
16/9/92	Lion's Mountain.
17/9/92	Constantiaberg, Vlakkenberg and Houtboschberg.
22/9/92	Claremont.
25/9/92	Muizenberg.
28/9/92	Cape Town.
1/10/92	Malmesbury.
2/10/92	Malmesbury and Wynberg.
11/10/92	Tulbagh.
29/10/92—28/12/92	Near Riversdale, Gouritz River Mouth, Garcias Pass and Langeberg (1701–2031 and 2219).
1–26/1/93	Near Zuurbraak, Swellendam, Riversdale and Tradouw Pass. The Tradouw Pass is north of Zuurbraak (2035–2165).
3–14/2/93	Near Riversdale and Garcias Pass (2168–2218).
2–4/3/93	Near George and Montagu Pass (2220–2244).
6–7/3/93	Klip Drift and Montagu Pass. Klippedrift is about 12 miles N.N.W. of George (2247–2288).
9–21/3/93	Near George and Montagu Pass (2294–2376 and 2464–2466).
23/3/93	Swart River, Kaaiman's River and Victoria Bay. See Map 1 inlet (2380–2382 and 2399).
24/3/93 — 1/4/93	Near George (2385–2443).
4–7/4/93	Christina Bay, Silver River and Pacaltsdorp (2444–2458).
8/4/93	Near George (2459).
11/4/93	Great Brak River (2479).
14–29/4/93	Near Uitenhage. In view of the great distance between this and the last station, and as there was no railway linking them, Schlechter probably went most of the way by sea (2488–2599).

May 1893	Near Grahamstown (2602–2678).
10–11/5/93	Boschberg and Somerset East. Boschberg is north of Somerset East (2696, 2703 and 2704).
May 1893	Near Grahamstown (2698–2700 and 2712–2726).
May 1893	Port Alfred (2732–2740).
May 1893	Near Grahamstown (2754–2766).
17–19/6/93	Near Durban. For localities near Durban see map 2 inlet. Schlechter propably reached Durban by sea (2770–2797).
22/6/93	Near Isipingo (2803–2808).
26/6/93	Clairmont. Clairmont, Natal, is now called Clairwood (2831–2843).
28/6/93	Mouth of Umgeni (2844–2852).
1–5/7/93	Near Durban and Avoca (2854–2885).
6–8/7/93	Phoenix (2887–2924).
11–12/7/93	Near Durban (2926–2935).
14/7/93	Phoenix (2936–2938).
15–18/7/93	Clairmont (2945–2955).
21/7/93	Mouth of Umgeni (2962 and 3001–3002).
22/7/93	Clairmont (2973–2976).
28/7/93	Durban (2983).
29/7/93	Isipingo (2992 and 3005).
1/8/93	Avoca (3010–3017).
2/8/93	Near Durban (3019).
4/8/93	Phoenix (3025–3033).
5–8/8/93	Clairmont and Phoenix (3034–3064).
9/8/93	Congella (3069–3070).
10/8/93	Umgeni (3071–3078).
14/8/93	Umgeni and Durban (3081–3083).
15/8/93	Clairmont (3084–3092).
17/8/93	Bellair (3099–3103).
19/8/93	Phoenix (3123).
22/8/93	Clairmont (3134–3143).
Date not known	Clairmont, Phoenix and Durban (3151–3164).
12/9/93	Pinetown (3165–3170).
12–14/9/93	Krantzkloof. Krantzkloof is about four miles north-west of Pinetown (3174–3217).
15/9/93	Emberton and near Gillitts. Emberton is about seven miles, and Gillitts about six miles west of Pinetown (3223–3242).
Date not known	Inchanga and Bothas Hill. Bothas Hill is about seven miles east of Inchanga (3245 and 3253).
16/9/93	Near Cato Ridge (3257–3259).
17/9/93	Camperdown (3275–3286).
18–20/9/93	Pietermaritzburg (3288–3305).
21/9/93	Howick and Umgeni Waterfall. Umgeni Waterfall is close to and to the east of Howick (3312–3320).
22/9/93	Houtboschrand. Houtboschrand runs along the east side of the road between Howick and Weston (3325–3329).
23/9/93	Mooi River and near Weston. Weston is close to Mooi River to the north (3334–3343 and 3348).
24–26/9/93	Estcourt (3346 and 3353–3357).
27/9/93	Ladysmith and Colenso (3365–3378 and 3431–3432).
28/9/93	Onderbroekspruit. Onderbroekspruit is about two miles north of Colenso.
29/9/93	Mooi River. It seems probable that this date is not correct.
1/10/93	Wesselsnek (3395).
4/10/93	Ngagane (3403–3408).
5/10/93	Newcastle (3409–3427).
7/10/93	Ingogo (3430).
10/10/93	Volksrust.
11/10/93	Between Volksrust and Perdekop (3440–3444).
13/10/93	Between Perdekop and Standerton (3457).
14/10/93	Standerton and Waterval River (3464).
16/10/93	Standerton (3465–3469).

17/10/93	Waterval River. The Waterval River crosses the road about a mile south of Val (3478).
18/10/93	Between Waterval River and Suikerbosrand, and at Suikerbosrand. Suikerbosrand is about eleven miles south-east of Heidelburg (3486–3498).
19/10/93	Suikerbosrand (3499–3507).
20–21/10/93	Heidelberg (3509–3533).
22/10/93	Elsburg and Mooifontein. Elsburg is about ten miles south-east, and Mooifontein about 23 miles north of the centre of Johannesburg (3542–3561).
23/10/93	Rietfontein. Rietfontein is about thirty miles north-east of the centre of Johannesburg (3570).
24/10/93	Sesmylspruit. Sesmylspruit is west of Lyttelton (3573–3581).
28/10/93	Pretoria (3587–3589).
29/10/93	Wonderboom. Wonderboom is about a mile south of Pretoria North (3595).
30/10/93—2/11/93	Pretoria (3597–3606).
3–10/11/93	Magaliesberg near Wonderboom, and Apies River. Apies River is about four miles south of Hammanskraal (3609–3690).
12–15/11/93	Pretoria (3692–3704).
16/11/93	Donkerhoek. Donkerhoek is about fifteen miles east of Pretoria (3708–3725).
17/11/93	Honde River. The Honde River crosses the road four miles west of Bronkhorstspruit (3728–3738).
18/11/93	Wilge River (3742–3751 and 3757).
19/11/93	Brugspruit. Brugspruit is five miles west of Witbank (3752–3756).
20/11/93	Near the Little Olifants River. This station is near Middelburg (3768–3774).
22–24/11/93	Botsabelo. Botsabelo is about eight miles N.N.W. of Middelburg (3777–3786).
25–30/11/93	Little Olifants River and Middelburg (3789–3824).
2–7/12/93	Elandspruitberge. These are the Steenkampsberg. Elandspruit is ten miles north-east of Dullstroom (3828–3896).
8–9/12/93	Crocodile River (3899–3919).
10–16/12/93	Lydenburg (3922–3987).
17/12/93	Crocodile River.
18–19/12/93	Elandspruitberge near Lydenburg (3988–4006).
20/12/93	Bergendal. Bergendal is about four miles east of Belfast (4008–4016).
21–22/12/93	Little Olifants River (4018–4055).
23–29/12/93	Little Olifants River near Botsabelo and Middelburg (4054–4097).
31/12/93	Near Middelburg (4103–4106).
1/1/94	Near the Little Olifants River (4109–4111).
2/1/94	Brugspruit (4115–4119).
3/1/94	Wilge River (4121–4129).
4/1/94	Donkerhoek (4131–4136).
5/1/94	Near Mundts Farm, and near Pienaars River. Mundts Farm has not been identified, but the Pienaars River crosses the road about fifteen miles east of Pretoria. This station should not be confused with a later one where the river crosses the road running north from Pretoria (4139–4143).
6–12/1/94	Pretoria (4144–4158).
13–15/1/94	Near Apies River and Black Kopjes (or Swart Koppies). There is a Swart Koppies about fifteen miles north-west of Pretoria (4161–4179).
16/1/94	Hammanskraal (4182–4203).
17/1/94	Pienaars River (4207–4223).
18/1/94	Vaalboschfontein. Vaalboschfontein is about seven miles N.N.E. of Pienaars River (4227).
19/1/94	Sandfontein. Sandfontein is about fifteen miles E.N.E. of Pienaars River (4248–4250).

20/1/94	Tweefontein and ? Modimolle. Tweefontein is about seven miles east of Warmbad. The other locality has not been identified (4260–4261).
21/1/94	Magalakwin River. This appears to be the Nyl River which runs into the Magalakwin River north-west of Potgietersrust (4271–4278).
22/1/94	Badsloop. This is probably the Bad Zyn Loop about fifteen miles north-east of Nylstroom (4282–4292).
23/1/94	Naboomfontein. Naboomfontein is about twenty miles south-west of Potgietersrust (4298–4306).
24–25/1/94	Near Moorddrift. Moorddrift is about ten miles south-west of Potgietersrust (4308–4317).
29/1/94	Mparneberg. This has not been identified but is certainly not Mopane which is much further north.
31/1/94	Makapaanspoort (4318–4330).
1/2/94	Marabastad (4335–4344).
2/2/94	Pietersburg and ? Nazareth (4352–4373).
3/2/94	Sandloop. Sandloop was probably the same as, or very close to, Boyne which is ten miles west of Haenertsburg (4375–4377).
4–11/2/94	Houtboschberg and Mphome. Mphome is eight miles N.N.W. of Haenertsburg (4382–4475).
13/2/94	Nazareth, between Houtboschberg and Klipdam (4478–4487).
14/2/94	Klipdam. Klipdam is about fifteen miles north of Pietersburg (4491–4493).
15/2/94	Ramagoep (4503–4507).
16/2/94	Mahilaskop. Mahilaskop is about eight miles east of Bandelierkop (4510–4517).
18/2/94	Elim and Valdesia. Valdesia is about ten miles north-east of Elim (4520–4525).
19–20/2/94	Limvovo River. For a discussion as to why this can probably be taken as the Pafuri River see note at the end (4527).
21–27/2/94	Valdesia (4532–4543).
1–5/3/94	Matsaba, Sand River, Elim, Mahilaskop and ? Brak River. Matsaba has not been located, and the identity of the Brak River has not been determined (4547–4597).
6/3/94	Zoutpansberg and Goedgedacht. Goedgedacht is about 22 miles west of Louis Trichardt (4600).
7/3/94	Mara (4609–4614).
8/3/94	Brak River (4618).
9/3/94	? Manaka and ? Matepe. Neither of these names has been identified (4636–4643).
10/3/94	Blouberg (4645–4651).
11/3/94	Magabene (4658–4667).
12/3/94	? Mapetse and Magabene. Mapetse has not been identified.
13/3/94	Moletse and Magabene. Moletsis Location is fifteen miles north-west of Pietersburg (4659 and 4678).
15/3/94	Marabastad (4693).
16/3/94	Makapaanspoort (4684–4689).
24/3/94 — 1/4/94	Houtboschberg, Mamavulu, Mount Myorul and Mparneberg (4697–4762).
8/4/94	Magalakwin River (4771–4776).
17/4/94	Pretoria.
3–8/7/94	Sir Lowry's Pass (4789–4838).
16–17/8/94	Piquetberg Road. Piquetberg Road is now Gouda (4839–4843 and 4850–4856).
17–18/8/94	Saron (4847–4849 and 4861–4878).
18–20/8/94	Porterville (4880–4914).
21–23/8/94	Piqueniers Kloof and slopes of the Olifants River near Modderfontein. The road over Piqueniers Kloof has been known as Grey's Pass (4922–4988).
24–25/8/94	Olifants River (4989–5031).

26/8/94	Olifants River near Rondegat. Rondegat is about seven miles S.S.E. of Clanwilliam (5038–5049).
27/8/94 — 1/9/94	Olifants River Mountains near Piqueniers Kloof, Clanwilliam and Modderfontein (5053–5120).
1–3/9/94	Alexandershoek. Alexandershoek is about 24 miles north-west of Piqueniers Kloof (5124–5159 and 5172).
4/9/94	Zwart Bas Kraal. Zwart Bas Kraal or Swartboschkraal, as Schlechter called it, is immediately to the south of Alexandershoek (5161–5177).
5–10/9/94	Piquetberg (5180–5277).
11/9/94	Near Braakfontein. This locality has not been identified.
12–13/9/94	Hopefield (5295–5334).
14/9/94	Darling (5335–5352).
10–11/10/94	Sir Lowry's Pass (5353–5364).
12/10/94	Sir Lowry's Pass, Houw Hoek and Steenbrass River (5370–5388).
13/10/94	Steenbrass River and Palmiet River (5391–5430).
14–15/10/94	Houw Hoek and Bot River (5434–5523).
16–20/10/94	Swartberg near Caledon and Riviersonderend (5537–5649).
22–23/10/94	Langeberg near Swellendam and Zuurbraak (5662–5710).
28/10/94	Gouritz River (5717–5721).
30–31/10/94	Near Mossel River (5725 and 5764).
31/10/94	Great Brak River and near George (5730–5755).
1/11/94	Blanco and near George (5765–5782).
2–4/11/94	Montagu Pass (5783–5855).
5/11/94	Near George (5856–5868).
6/11/94	Silver River (5869–5883).
7/11/94	Little Homtini River and Karatara River (5885–5895).
8/11/94	Great Homtini River (5899–5902).
9–11/11/94	Near Knysna, Plettenberg Bay and near the Keurbooms River (5906–5950).
13–15/11/94	Zitsikamma, Storms River and Humansdorp (5951–5998).
16–19/11/94	Clarkson, Humansdorp and Kabeljaaw's River (5999–6035).
21–22/11/94	Gamtoos River (6040–6063).
23/11/94	Van Staadens River (6067–6076).
25/11/94	Swartkops River.
21–22/12/94	Bothas Hill and near Grahamstown (6083–6103).
22/12/94	Near the Fish River (6104–6114).
23/12/94	Kieskamma (6117).
24/12/94	Debe Nek (6118).
28–29/12/94	King William's Town (6120–6126).
30/12/94	Kei Road (6131–6136).
31/12/94	Gonubi River (6137–6151).
2–4/1/95	Komgha (6162–6181).
6–12/1/95	Kei River and Komgha (6205–6249).
14/1/95	Ibeka. Ibeka is about six miles E.N.E. of Butterworth (6255).
15/1/95	Idutywa (6269–6277).
16/1/95	Bashee River (6281–6299).
17/1/95	? Ingungo (6308–6313).
18–20/1/95	Umtata (6322–6352).
21–25/1/95	Tsitsa River, ? Highlands, Umzimvubu, Tina River, Qumbu, ? Moros River, Mount Frere and Mount Ayliff (6305, 6320 and 6361–6432).
26–28/1/95	Insiswa Mountain (6438–6523).
29/1/95	Mount Ayliff (6524–6533).
31/1/95	Umzimhlava River (6540–6564).
31/1/95	Foot of Mount Currie. Mount Currie is between Kokstad and Franklin (6565).
1–3/2/95	Zuurberg. This Zuurberg runs north of the road between Kokstad and Clydesdale (6567–6614).
5/2/95	Clydesdale. Clydesdale is two or three miles south of Umzimkulu (6616–6623).
7/2/95	Umzimkulu River (6630–6637).

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7–9/2/95	Ixopo (6644–6679).
9–10/2/95	Umkomaas River (6680–6711).
11–13/2/95	Umlazi and near Richmond. Umlazi is nine miles north-east of Richmond (6716–6745).
16–17/2/95	Near Pietermaritzburg (6748–6757).
17/2/95	Hilton Road. Hilton Road is about eight miles south-east of Howick (6768).
17–19/2/95	Howick (6773–6793).
19/2/95	Curries Post (6804–6809).
20/2/95	Near Mount West. Mount West is about ten miles north of Curries Post (6821–6823).
20/2/95	Karkloof (6831–6833).
22/2/95	Mooi River (6835–6839).
23/2/95	Highlands. Highlands is about five miles N.N.W. of Mooi River (6847–6851).
25/2/95	Blou Krans River (6862–6873).
27/2/95 — 1/3/95	Sand River (6895–6909).
2–6/3/95	Van Reenen (6911–6992).
	Europe. No collecting.
13–18/1/96	Sir Lowry's Pass (7201–7300).
25–26/1/96	Cape Point and Simonstown (7301–7323).
3–10/2/96	Palmiet River and Houw Hoek (7324–7455).
15/2/96	Tulbagh Waterfall (7456–7483).
16–17/2/96	New Kloof (7484–7506 and 7529–7531).
18/2/96	Tulbagh Waterfall (7508–7518).
19/2/96	New Kloof (7523–7528).
29/2/96	Wynberg (7532–7545).
3/3/96	Lion's Mountain (7546).
8–14/4/96	Houw Hoek (7547–7589).
16/4/96	Bot River (7590–7591).
17/4/96	Caledon (7593–7604 and 7583).
18/4/96	Klein River. The Klein River runs into the Lagoon at Hermanus (7605–7609).
18–27/4/96	Elim and between Elim and the Ratels River. Ratelrivier is S.S.W. of Elim, and the Ratels River rises about four miles south-west of Elim (7610–7745).
28/4/96	Genadendal (7746–7754).
29/4/96	Caledon (7755).
30/4/96	Bot River (7756).
30/4/96	Caledon (7757–7765).
30/4/96 — 1/5/96	Houw Hoek (7760, 7766–7790 and 10449).
2–5/5/96	Sir Lowry's Pass (7791–7819).
19/5/96	Durbanville (7822–7828).
25–31/5/96	Camps Bay (7829–7831).
15/6/96	Worcester (7832).
21/6/96	Piquetberg Road. (Gouda) (7834–7843).
21–23/6/96	Saron (7844–7892).
24–27/4/96	Piquetberg (7893–7918).
27/6/96	Vogelvlei. This is probably Klein Vogelvlei about six miles north-east of Piquetberg (7919–7927).
28–30/6/96	Piqueniers Kloof (7928–7961).
30/6/96	Modderfontein (7962–7972).
1/7/96	Brakfontein. Brakfontein is six or seven miles north of Citrusdal (7973–7986).
2/7/96	Olifants River (7987–8002).
3–5/7/96	Clanwilliam (8004–8028).
5–6/7/96	Langekloof and Bulshoek. The Langekloof runs north-west of Clanwilliam (8029–8050).
7/7/96	Doorn River (8051–8066).
8–9/7/96	Windhoek. Windhoek is about four miles north-east of Klaver (8067–8080).
9–10/7/96	Atties (8081–8090).

11/7/96	Van Rhynsdorp (8091–8095).
12/7/96	Vars River (8097–8101 and 8149).
12–15/7/96	Zout River (8105–8148).
16/7/96	Knersvlakte. The Knersvlakte are to the east of the road south of Nuwerus (8150–8166 and 8461).
17–21/7/96	Karreebergen. The farm Karreeberg is about thirteen miles south-east of Bitterfontein (8167–8258).
21/7/96	Klein Vlei (8259–8261).
22–25/7/96	Karreebergen (8262–8311).
26/7/96	Knersvlakte (8312–8313).
28/7/96	Zout River (8314–8318).
29/7/96	Drooge River (8320–8324).
30/7/96	Atties (8325–8333).
30/7/96 — 1/8/96	Windhoek, Koudeberg and Giftberg. The Giftberg is to the east and south-east of Klaver (8335–8371).
2/8/96	Bulshoek (8372–8383).
3/8/96	Langekloof (8385–8401).
4–6/8/96	Clanwilliam (8402–8429).
6–7/8/96	Boschkloof. Boschkloof is immediately north-east of Citrusdal (8430–8434).
8–9/8/96	Blaauwberg. Blaauwberg is about fifteen miles N.N.W. of Citrusdal (8435–8454).
9/8/96	Boschkloof (8455–8457).
10/8/96	Blaauwberg (8462–8475).
11/8/96	Olifants River (8477–8479).
12–13/8/96	Zeekoe Vlei. Zeekoe Vlei is about nine miles west of Clanwilliam (8480–8510).
13–14/8/96	Vogelfontein. Vogelfontein is immediately north of Graafwater (8511–8524).
14–15/6/96	Zuurfontein. Zuurfontein is about four miles inland from Lamberts Bay (8526–8536).
16/8/96	Lamberts Bay (8539–8547).
16–17/8/96	Zuurfontein (8548–8562).
18/8/96	Graafwater (8563–8571).
19/8/96	Zeekoe Vlei (8573–8582).
21–22/8/96	Clanwilliam (8583–8600 and 8525).
22–25/8/96	Packhuisberg and Packhuis Pass (8601–8662).
25/8/96	Boontjies River. The Boontjies River joins the Brandewyn River about four miles E.N.E. of Packhuis (8663–8678).
26/8/96	Bidouwberg. The Bidouwberg is north of the Bidouw River (8681–8695).
27/8/96	Hoeck (8696–8715).
28–31/8/96	Koudeberg near Wupperthal (8718–8787).
1/9/96	Kerskop. This station has not been identified, but could be Spitskop which is south-east of Wupperthal (8788–8799).
1–3/9/96	Eselbank. The Eselbank River crosses the road between Wupperthal and Matjes River almost due east of Kriedouwkrantz (8801–8839).
4/9/96	Matjes River (8840–8848).
5–9/9/96	Cold Bokkeveld (8849–8930).
10–11/9/96	Michells Pass (8931–8970).
11–12/9/96	Ceres Road. (Wolseley.) (8971–8994).
13/9/96	Tulbagh Road (8995–9001).
13/9/96	Tulbagh Waterfall (9002–9014).
13–14/9/96	New Kloof (9016–9021).
September 1896	Green Point (9022 and 9033).
September 1896	Rondebosch (9024).
October 1896	? Eerste River (9025).
9/11/96	New Kloof (9026–9048).
10/11/96	Tulbagh Waterfall (9050–9065).
10–11/11/96	Ceres Road. (Wolseley.) (9066–9090).
11–15/11/96	Near Bains Kloof (9092–9205).

16/11/96	Paarl (9206–9212).
16–21/11/96	Franschhoek (9214–9363).
23/11/96	Near Villiersdorp (9364–9373).
24–26/11/96	Houw Hoek (9374–9435).
27/11/96	Bot River (9436–9457).
28/11/96	Dunes near Hawston (9459–9480).
29/11/96	Near Onrust River (9481–9506).
30/11/96 — 2/12/96	Vogelgat. Vogelgat is to the north-east of the mouth of the Klein River (9507–9579).
3–4/12/96	Koude River. The Koude River was crossed about eight miles W.N.W. of Elim (9580–9635).
6–7/12/96	Elim (9636–9651).
9/12/96	Napier (9652–9661).
9/12/96	Elim (9662–9674).
10/12/96	Rietfontein. Rietfontein is about ten miles S.S.E. of Elim (9675–9707).
11/12/96	Elim (9708–9709).
12/12/96	Ratels River (9710–9725).
14/12/96	Bredasdorp (9726–9727).
15/12/96	Koude River (9728–9742).
16–17/12/96	Elandskloof. Elandskloof is about six miles W.N.W. of Napier (9744–9766).
18/12/96	Swartberg. The Swartberg runs to the north and east of Caledon (9767–9776).
19/12/96	Steenbok River. The Steenbok River was crossed about seven miles E.S.E. of Caledon (9777–9780).
21/12/96	Swartberg (9781–9794).
21–31/12/96	Genadendal (9795–9883).
5–6/1/97	Riviersonderend (9884–9897).
7–8/1/97	Villiersdorp (9899–9919).
8–9/1/97	Brandvlei (9921–9941).
9–11/1/97	Goudini (9942–9948).
12/1/97	Near Ceres Road. (Wolseley.) (9949).
14–15/1/97	Michells Pass (9950–9978).
16/1/97	Prince Alfred (9979–9987).
17/1/97	Skurfdeberg near Gydouw (9988–10012).
18/1/97	Elandsfontein. Elandsfontein is at the junction of the main Cold Bokkeveld road and the road to Karoopoort (10013–10042).
19/1/97	Gydouw Mountains (10044–10051 and 10220–10240).
20/1/97	Klein Vlei. This is the last farm before the turning to the central Cedarberg (10052–10068).
21/1/97	Wagensdrift. Wagensdrift is at the turning leading into the central Cedarberg (10069–10080).
22/1/97	Tafelberg. The Tafelberg is about ten miles north-east of Wagensdrift (10082–10106).
23/1/97	Cold Bokkeveld (10108–10115).
24/1/97	Tweefontein. Tweefontein is about eleven miles north of Wagensdrift (10117–10133).
25/1/97	Sandfontein. Sandfontein is about fifteen miles south-east of Citrusdal (10134–10150).
27/1/97	Wagenbooms River. Wagenbooms River is about twenty miles south-east of Citrusdal (10151–10172 and 10700–10703).
28/1/97	Skurfdeberg behind Schoongezicht. Schoongezicht is two or three miles south of Wagenbooms River 10175–10193).
29–30/1/97	Klein Vlei (10195–10219).
4–7/2/97	Bains Kloof (10241–10261).
11–12/2/97	Franschhoek (10262–10282).
15/2/97	Genadendal (10283).
1–5/4/97	Genadendal (10284–10338).
6/4/97	Swartberg near Sandfontein. Sandfontein is near Krige Railway Station (10339–10359).
7/4/97	Swartberg near Caledon (10361–10370).

8–10/4/97	Hemel an Aarde. Hemel en Aarde is just north of Hermanus (10373–10382).
10/4/97	Onrust River (10384–10399).
11/4/97	Vogelgat (10401–10426).
13/4/97	Near Stanford (10427–10433 and 10696–10697).
14/4/97	Papiesvlei. Papiesvlei is to the E.S.E. of Stanford (10434–10448 and 10698 and 10705).
15–16/4/97	Koude River (10449–10470).
21/4/97	Elim (10471–10476).
23/4/97	Vogelvlei. Vogelvlei is about seven miles south-east of Elim (10477–10496).
24–25/4/97	Mierkraal. Mierkraal is about twelve miles E.S.E. of Elim (10497–10538 and ? 10699).
26/4/97	Zeekoevlei. Zeekoevlei is about six miles south of Bredasdorp (10539–10551).
27/4/97	Agulhas (10553–10568 and 10571).
28/4/97	Rhenosterkop. Rhenosterkop is about five miles north of Agulhas (10570–10576 and 10603).
30/4/97	Brandfontein. Brandfontein is on the coast S.S.E. of Elim (10577–10585).
30/4/97	Rietfontein (10586–10599).
July 1897	Lion's Mountain (11504).
3/8/97	Piquetberg Road. (Gouda.) (10706–10712).
4–5/8/97	Porterville (10714–10745).
6–7/8/97	Piqueniers Kloof (10746–10773).
8/8/97	Packhuisberg (10775).
8/8/97	Brackfontein (10778–10786).
9/8/97	Rondegat. Rondegat is about seven miles S.S.E. of Clanwilliam (10787—10792).
10–12/8/97	Packhuisberg (10793–10819).
13/8/97	Brandewyn River (10820–10830).
14/8/97	Lammkraal. No Lammkraal has been found, but there is a Langkraal about seven miles past the Brandewyn River (10832–10850).
15/8/97	Agtertuin. Agtertuin is about four miles from the Doorn River on the Clanwilliam side. (10851–10868).
16/8/97	Doornrivier (10869–10884).
17/8/97	Boterkloof (10885–10889).
18–19/8/97	Papelfontein. This is probably Papekuilsfontein, about 26 miles east of Van Rhynsdorp (10890–10913).
20/8/97	Matjesfontein. Matjesfontein is about 36 miles west of Calvinia (10914–10931).
21/8/97	Oorlogskloof. Oorlogskloof is about eight miles south-east of Nieuwoudtville (10932–10972).
24/8/97	Willems River (10973–10974).
24/8/97	Vuurfontein. Vuurfontein is half way from Nieuwoudtville to Van Rhynsdorp (10975–10979).
25/8/97	Klein Kobbis. Klein Kobe is a mountain south-east of Vuurfontein (10980–10993 and 10999).
26/8/97	Hills at Van Rhynsdorp (10994).
28/8/97	Oorkraal. Oorkraal is about ten miles south-east of Nuwerus (10995–10998).
30/8/97	Hills at Nuwerus (11002–11011).
31/8/97 — 2/9/97	Bitterfontein (11012–11049).
3/9/97	Eenkokerboem. Eenkokerboom is about seventeen miles N.N.W. of Bitterfontein (11051–11074).
4–5/9/97	Stinkfontein. Stinkfontein is on the Zwart Doorn River (11075–11098).
6/9/97	Garies (11099–11100).
7–9/9/97	Brackdam. Brackdam is about ten miles north of Garies (11101–11161).
10/9/97	Waterklip (11162–11178).

11/9/97	Rietkloof. Rietkloof is about twenty miles north of Garies (11179–11200).
12–13/9/97	I'Aus. Ouss is an old name for Kamieskroon (11203–11234).
14/9/97	Arakoop. Arakoop is about eight miles N.N.W. of Kamieskroon (11236–11249).
15/9/97	Buffels River (11254–11274).
16/9/97	Mesklip (11277–11290).
17/9/97	Vogelklip. Vogelklip is about five miles south of Springbok (11295–11311).
18/9/97	Springbokfontein. Springbokfontein is the old name for Springbok (11312).
19–20/9/97	Concordia (11313–11344).
21/9/97	Leeuwpoort. Leeuwpoort is about nine miles north of Concordia (11345–11353).
21/9/97	Goechas. Goechas is a couple of miles north of Leeuwpoort (11365–11379).
23/9/97	Steinkopf (11381–11383).
25/9/97	Karoechas (11384–11394).
26/9/97	I'us. This must not be çonfused with I'Aus or Ouss where he was on 12–13/9/97, and has not been located (11401–11434).
27/9/97	Wolveton. This is Wolftoon which is about nine miles south of Goodhouse (11438–11443).
28/9/97	Vuurdood. Vuurdood is about six miles south of Goodhouse (11444–11450).
28–29/9/97	Raymonds Drift (Raman's Drift) (11451–11473).
29/9/97	Vuurdood (11475–11477).
1–4/10/97	Steinkopf (11478–11503).
29/11/97 — 4/12/97	Lourenço Marques (11515–11603).
5/12/97	Katemba (Catembe) (11604–11616).
6–9/12/97	Lourenço Marques (11617–11683).
10/12/97	Matola (11684–11693 and 11725).
11/12/97	Lourenço Marques (11700–11711).
12/12/97	Umbolosi. This is probably Umbeluzi (11718–11722).
14–18/12/97	Komati Poort (11728–11826).
18/12/97	Ressano Garcia (11827–11831).
19–20/12/97	Komati Poort (11832–11871).
22–27/12/97	Ressano Garcia (11876–11952).
29/12/97 — 9/1/98	Delagoa Bay (11953–12013).
13–15/1/98	Incanhini. Incanine is 25 miles N.N.E. of Lourenço Marques (12016–12037).
17–18/1/98	? Magaioso (12045–12053).
19–20/1/98	Mococololo. Makokololo is a forest near Lourenço Marques (12056–12062).
21–23/1/98	Inyamasan (12065–12076).
24/1/98	Maranthene. Maramkene is near Lourenço Marques (12079).
27/1/98	Delagoa Bay (12080–12084).
1–2/2/98	Inhambane (12087–12092).
9/2/98	Morrumbene (12095–12105).
10/2/98	Insitva Maseku (12106–12115).
10–12/2/98	Machingas (Massinga) (12116–12138).
14/2/98	Ungulubi (12140–12145).
15–24/3/98	Delagoa Bay (12147–12166).
2/4/98	Beira (12172–12175).
6/4/98	Gonubi Hill (12176–12181).
6/4/98	Umtali (12182–12186).
7–8/4/98	Lion's Creek (12188–12223).
9/4/98	Fontisvilla. Now called Villa Fontes. Schlechter must have reached it from Umtali by the recently completed railway via Beira (12229).
10–14/4/98	25 mile Station. This is now called Dondo (12230–12294).

Note on Schlechter's claim that he had crossed the Limpopo on his trip to the Transvaal in 1894. (See Bot. Jahr. 20 Beiblatt 50 : 20–24.) In this article he says that after leaving the Houtboschberg, he passed some caves, "Spelonken", reached and crossed the Limpopo, entered the land of the Bawenda, and at the junction of the Litonandoa and Limpopo left his wagon so that he had to continue to Tsewasso with porters. From this itinerary it can be seen that he would have passed the place known today as Spelonken on his way to Elim and Valdesia. He would have crossed the Pafuri River into the Bavenda territory, and might have continued past the junction of Pafuri and Lutanandwa Rivers which is eighteen miles east of Elim. He may also have travelled to Sibasa—the modern name for Tsewasso—which is 22 miles E.N.E. of Valdesia. The nearest he could have come to the Limpopo was still at least 30 miles away, and there was no period when he could have covered this distance. The Pafuri River is also called the Luvuvhu River.

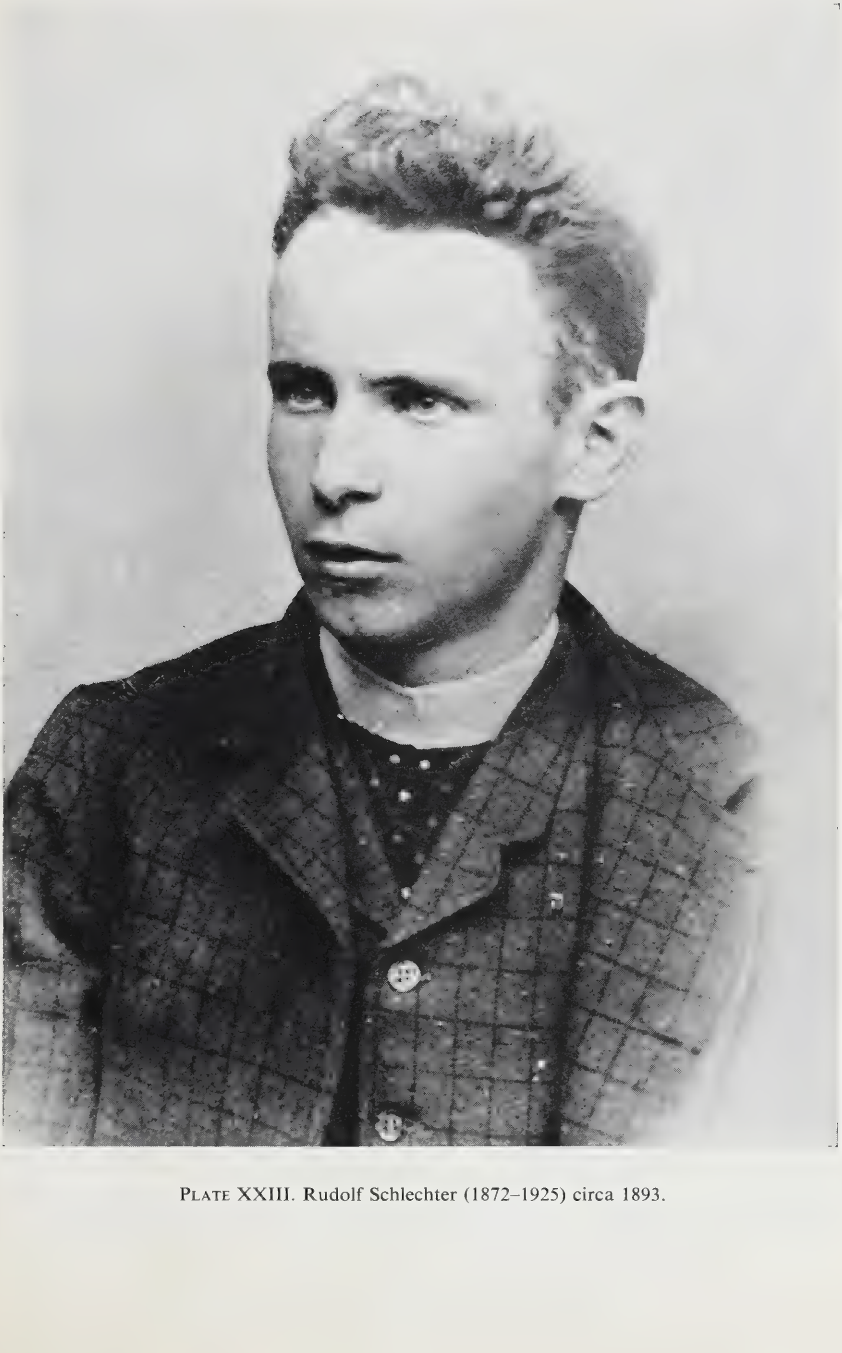
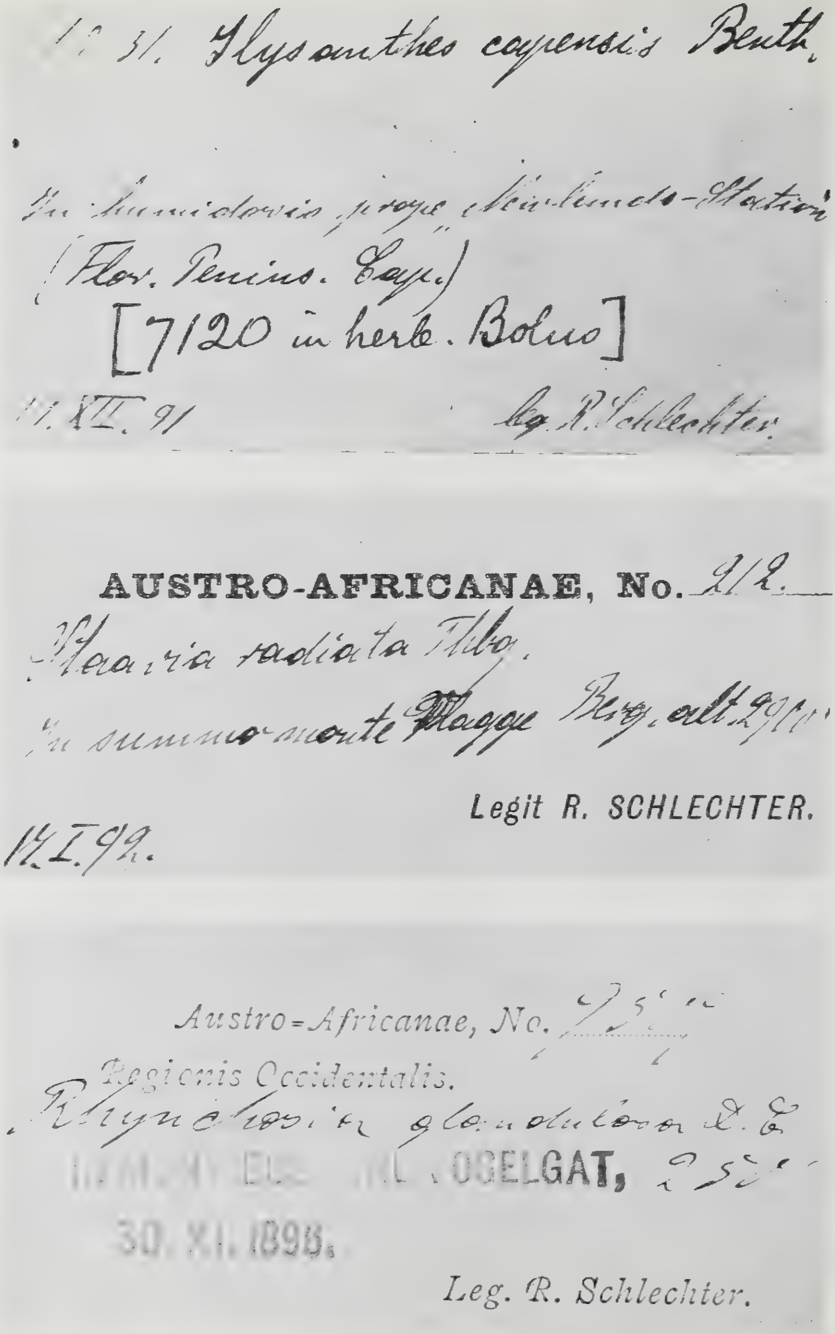


Plate XXIII. Rudolf Schlechter (1872–1925) circa 1893.



No. 31. Ilysanthes capensis Benth.

In humidosis prope Kenilworth-Station

(Flor. Penins. Cap.)

[7120 in herb. Bolus]

11. XII. 91 leg. R. Schlechter.

AUSTRO-AFRICANAE, No. 212.

Klearia radiata Thbg.

In summo monte Flagge Berg, alt. 2910'

Legit R. SCHLECHTER.

14. I. 92.

Austro-Africanae, No. 9551

Regionis Occidentalis.

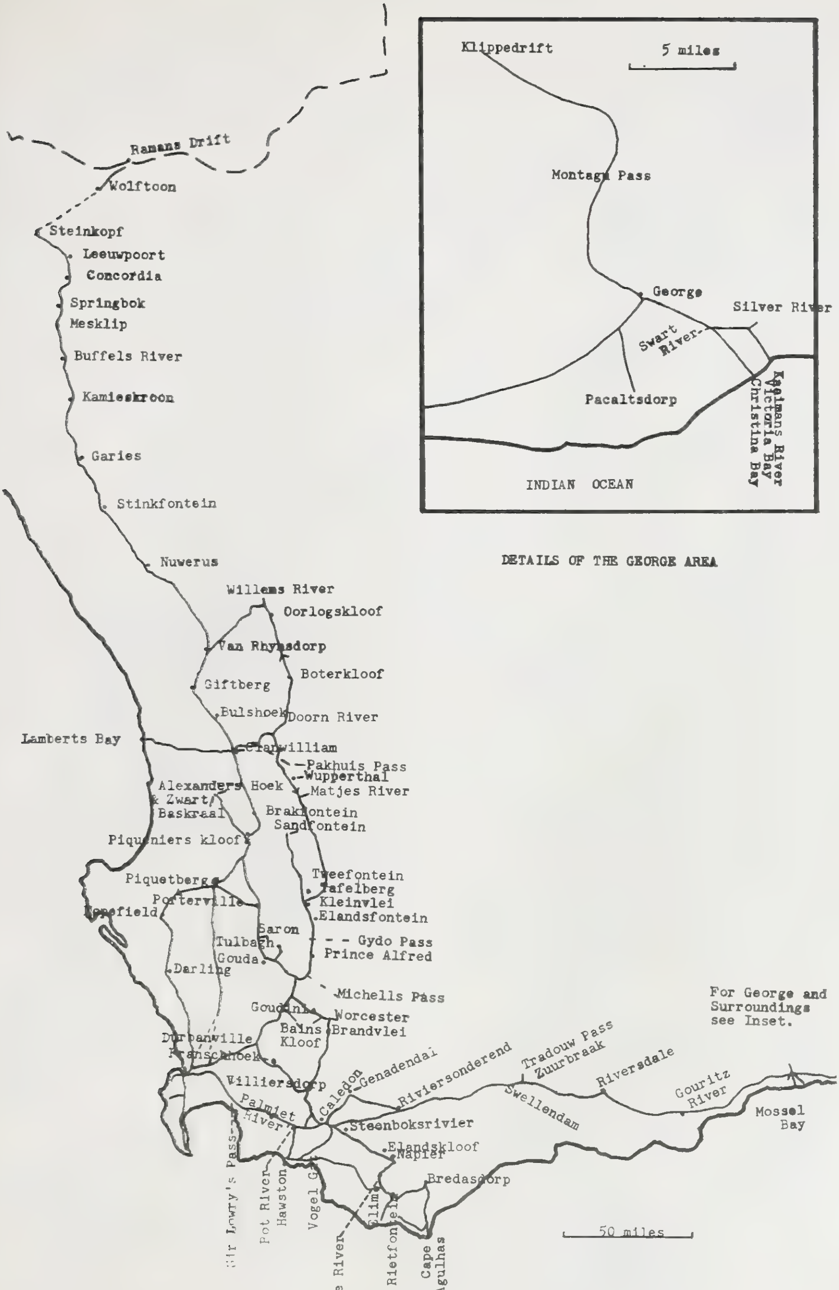
Rhynchosia glandulosa D.C.

[illegible] OGELGAT, 2500'

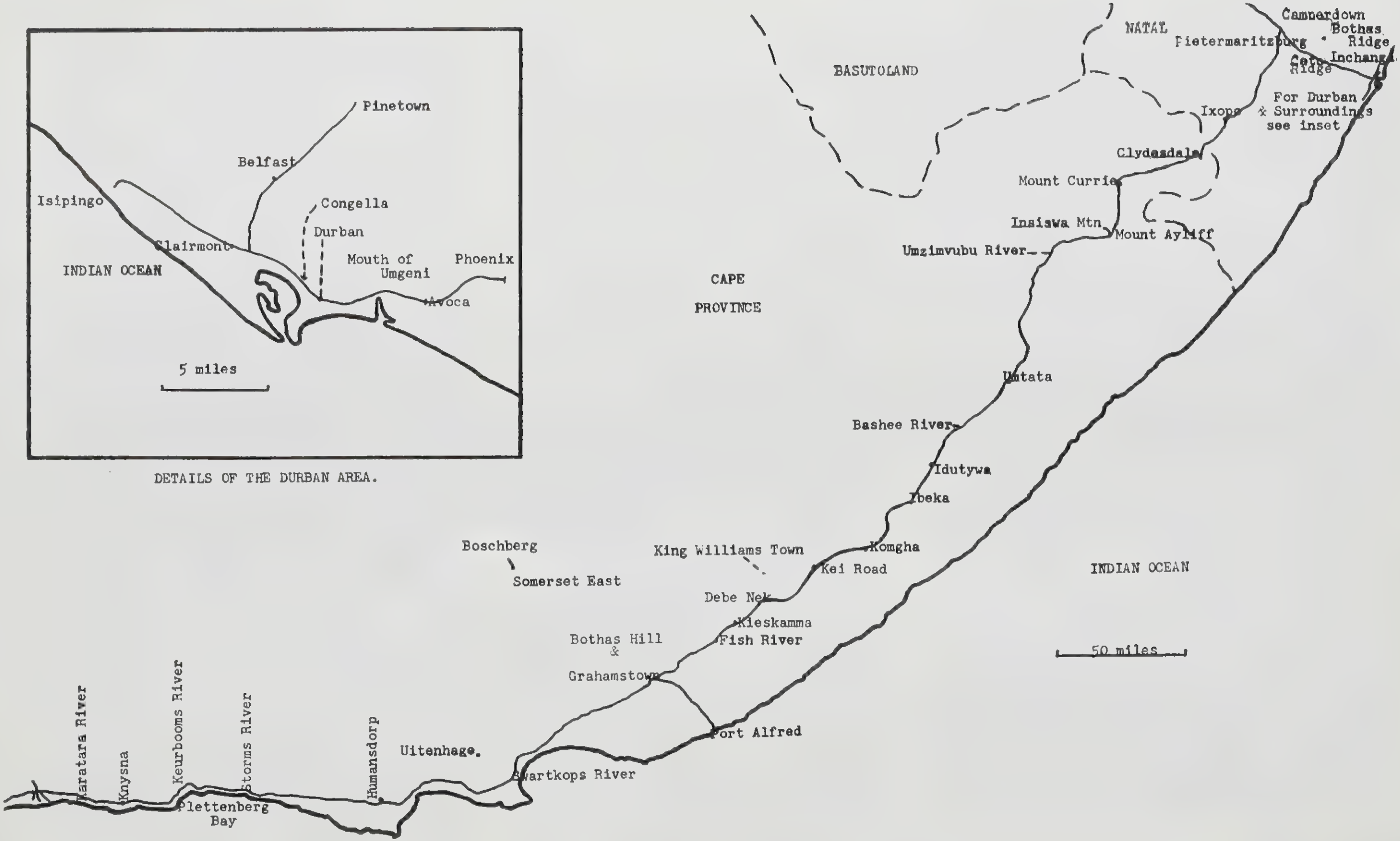
30. XI. 1898.

Leg. R. Schlechter.

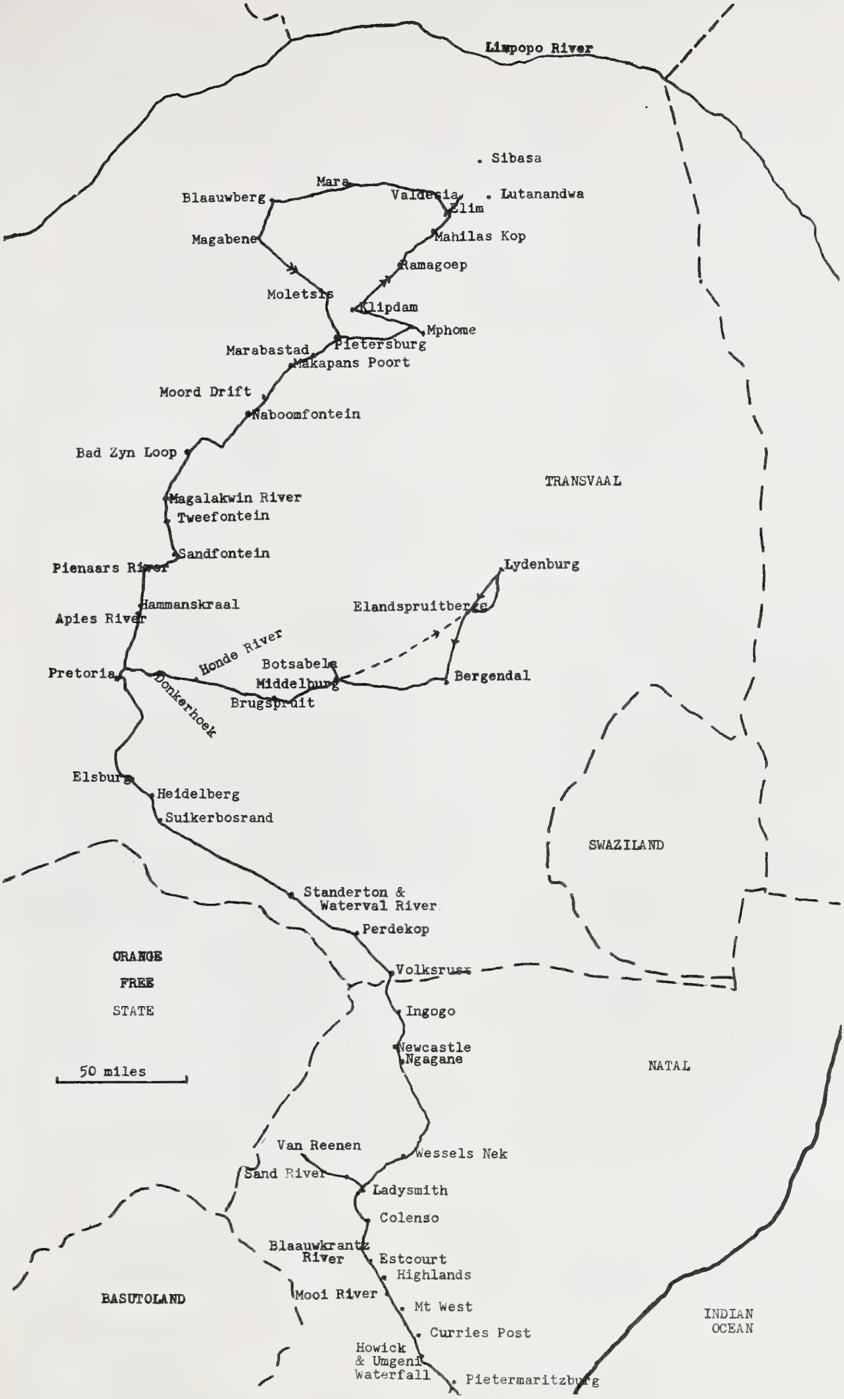
Plate XXIV. Three of Schlechter's collecting labels. The writing in square brackets in the top label is that of H. Bolus.



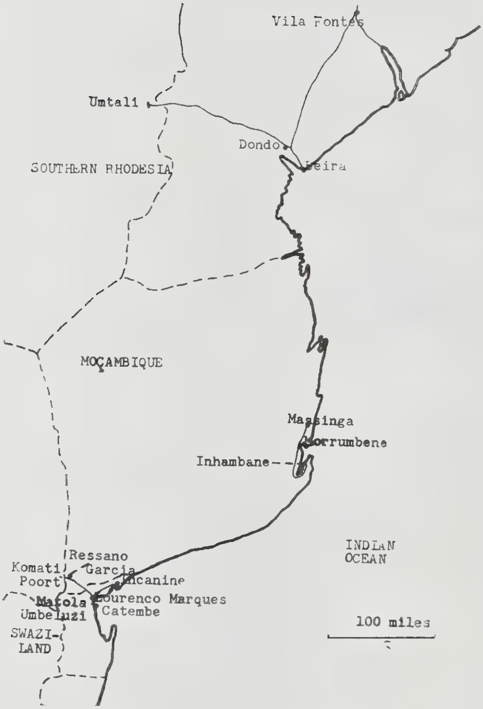
Schlechter's Travels, Map 1.



Schlechter's Travels Map 2.



Schlechter's Travels, Map 3.



Schlechter's Travels, Map 4.

C.T.P. LTD.

SOMATIC CHROMOSOMES OF THREE SPECIES OF HAEMANTHUS

J. B. Gouws

(*University College of the Western Cape*)

(With Plate XXV)

The genus Haemanthus, which is becoming more popular either as a garden or a pot plant, has, as yet, received very little attention from cytologists. The plants grow very well under cultivation and are easily obtainable in nature. Provisional investigation of the chromosomes already set some interesting cytological problems and, with these in mind, it was decided to determine the 2n numbers as a first step in a more complete cytological investigation. The present paper reports on the somatic chromosomes of three species of the genus that have hitherto not been investigated. The bulbs have been obtained from widely different areas where they grow naturally.

Comparison of permanent slides prepared according to Warmke's (1) and McClintock's (2) methods and temporary slides showed that dehydration invariably caused a certain degree of shrinkage. To prevent this, only temporary slides were used for the investigation.

Specimens were potted in pure sand and allowed to grow for some months before they were inspected for root-tips. These were fixed in Carnoy prepared according to Johansen's (3) second formula. After 2½ hours fixation the root-tips were transferred to 70% alcohol for 24 hours. This procedure seems to improve the stainability of the chromosomes considerably. Maceration was performed in N. H Cl at 60°C for 8 minutes and the root-tips were then transferred to Feulgen dye prepared according to the formula of Heitz (4). After three hours staining the root-tips were squashed, ringed with glycerine jelly and kept in the refrigerator for another 24 hours. This again seemed to improve the coloration of the chromosomes.

The slides were inspected with a Wilt student's microscope fitted with a 100x fluotar oil-immersion lens and 10x eyepiece. Suitable complexes were photographed with a Leica camera and drawn at table level by means of a Wilt drawing-tube.

RESULTS

Species	2n Number	Area
H. katharinae Baker	18	Chalbe desert, N. Kenya
H. tigrinus Jacq.	16	Faure, S.W. Cape
H. puniceus Jacq.	18	Boesmansrivier mouth, Cape.

TABLE I

DISCUSSION

The genus has, as yet, received very little attention from cytologists. Sato (5) was the first to report that *H. albiflos* has 2n = 16 chromosomes. Gouws (6) was the first to report 2n = 18 for *H. magnificus* and 2n = 16 for *H. nelsoni*. These numbers were corroborated by Wilsenach (personal communication).

H. katharinae has a very wide distribution, ranging from various areas in the Cape Province to the Chalbe desert, close to the Ethiopean border where the author collected the specimen here reported on.

Only well developed metaphase figures were chosen for the purpose of further study. Figures 3 and 4 of *H. puniceus* show the difference between a well developed metaphase complex and one in pro-metaphase.

Although there is much similarity between the different complexes there are also obvious differences as the following formulae show:—

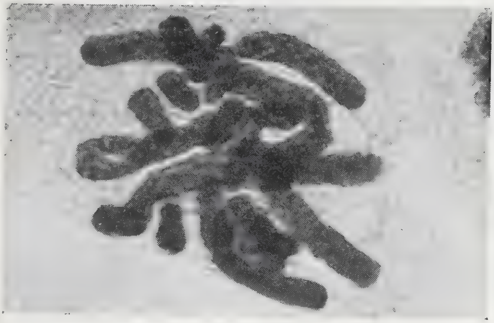
H. katharinae	2.l.L; 2.l.f; 5.b.L.
H. tigrinus	1.l.L; 1.l.V; 1.l.f; 1.b.f; 1.b.L; 2.b.V.
H. puniceus	1.l.L; 2.l.f; 2.m.f; 4.b.L.

TABLE 2. l(ongum)—long; m(edium)—; b(revis)—short.
V, L & f indicate the median, sub-median and sub-terminal positions respectively of the kinetochore.

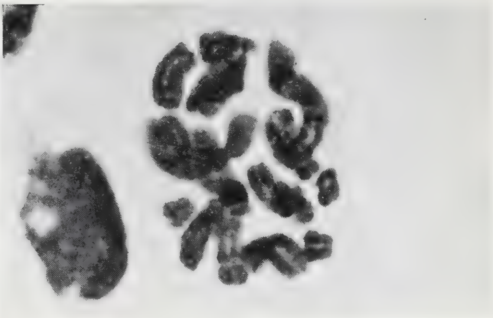
The chromosomes of the genus are exceptionally large with the result that the smaller chromosomes are often obscured by the larger ones.

Photomicrograph 4 has been added because it clearly shows the double nature of each chromatid during metaphase. Each chromosome shows three rows of light dots. One row on each chromatid caused by the spirals of 2 chromonemata. The middle row of dots is formed by the loops in the adjacent chromatids at their line of junction.

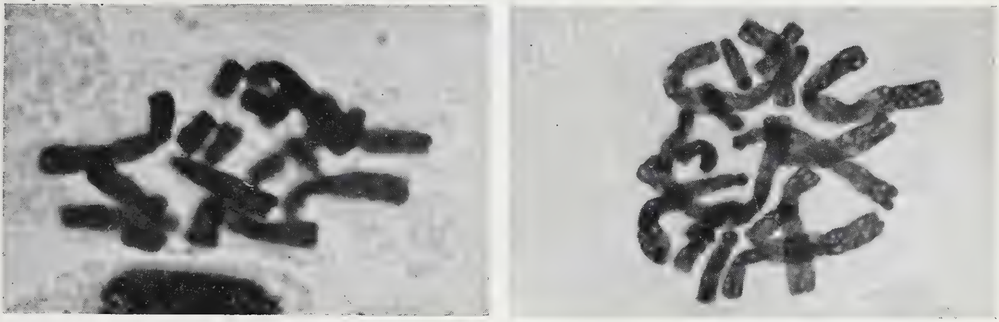
In 1949 Gouws (6) expressed the opinion that the 18 chromosome species may have arisen by the duplication of a pair of the short chromosomes. The opposite view was held by Wilsenach, who reasoned that the bulb (*H. nelsoni*) is a more highly developed form than the corm (*H. magnificus*). The 16 chromosome complex of the bulbous form should therefore be the derived complex.



Photomicrograph 1.—H. katharinae Baker.



Photomicrograph 2.—H. tigrinus Jacq.



Photomicrograph 3 and 4.—H. puniceus Jacq.

Plate XXV.

In the present investigation the two numbers 16 and 18 were both found for bulbous species. It would therefore appear that the development within the genus is a complex one which probably included many morphological aberrations in the chromosomes as well as a change in the 2n number. This latter change, however, does not seem to be associated with the development of either corm or bulb.

The chromosomes of *H. katharinae* are obviously longer and thicker than those of any other *H. sp.* yet investigated. Whether this is due to a laxity in the chromonemal spiralization or longer chromonemata is a point worthy of further investigation.

The varieties and forms of *H. katharinae* indigenous to Southern Africa are yet to be studied and compared to the results obtained from the specimen collected in the Chalbe desert.

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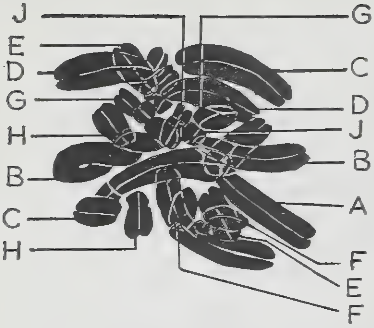

FIG. 1 *Haemanthus katharinae* Baker.

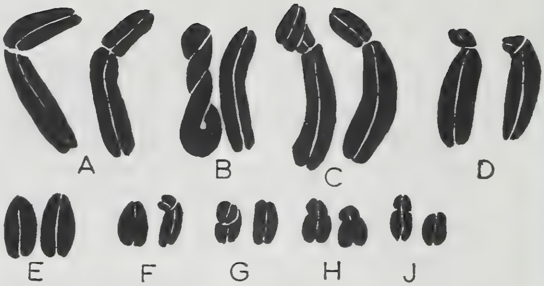

FIG. 1 *Haemanthus katharinae* Baker.

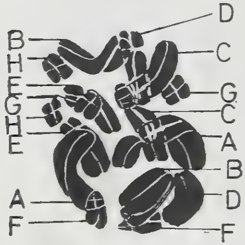

FIG. 2. *Haemanthus tigrinus* Jacq.

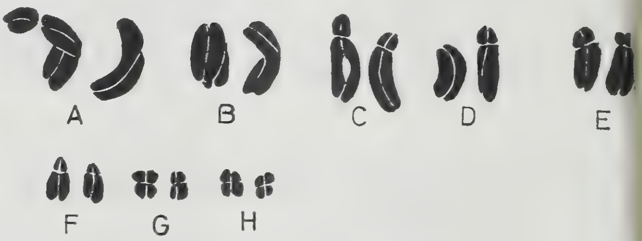

FIG. 2 *Haemanthus tigrinus* Jacq.

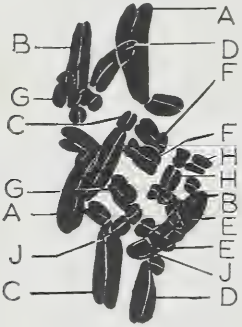

FIG. 3. *Haemanthus puniceus* Jacq.

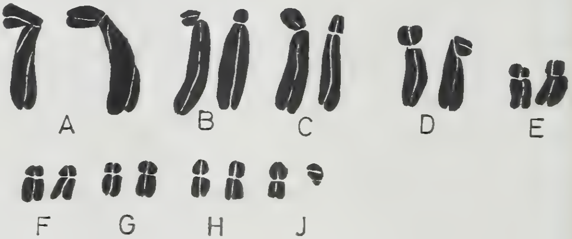

FIG. 3 *Haemanthus puniceus* Jacq.

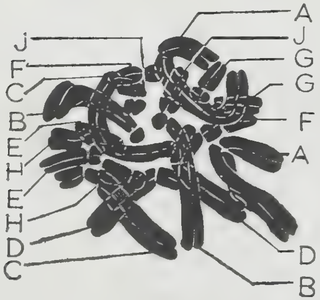

FIG. 4. *Haemanthus puniceus* Jacq.

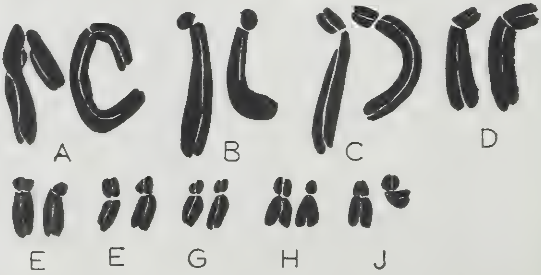

FIG. 4 *Haemanthus puniceus* Jacq.

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A CHECK LIST OF THE TREES OF SOUTHERN RHODESIA

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This check list is a by-product of the preparation of an illustrated key for the determination of Southern Rhodesian trees in the field on vegetative characters alone. In order to decide which of the trees of the country to include in this key, it was necessary to ascertain the total range of taxa which were known to occur. For this purpose, any plant known sometimes at least to have a single stem and to reach a minimum height of ten feet was accepted as a tree. While such a characterisation would perhaps not be applicable in the rain forest regions further north, unless as low a minimum height as this is employed for the definition of a tree in the savanna regions of Africa, the woody vegetation largely falls into a shrub category, and one is then left with the problem of distinguishing between large shrubs, medium-sized shrubs and small shrubs, and relating the large shrubs to the tree categories recognised elsewhere. It seemed advisable to avoid the use of a further category such as *bush*, sometimes used to describe small savanna trees.

It will be a number of years yet before the Flora Zambesiaca can be completed. When this has been done a list of the trees of the five territories included in this flora can be compiled from the records cited therein. However, it is likely that during the interval new records will have appeared, in fact already additional tree records have been made in the families covered in Volume I of this Flora.

The simultaneous preparation of other regional floras such as the Flora of Southern Africa in South Africa, the Flora of East Tropical Africa and the Flora of the Congo in particular, and to a lesser extent floras of more distant areas like the revised Flora of West Tropical Africa, and the Flora of Angola, are providing revisions of taxa which occur also in Southern Rhodesia, and are therefore necessitating nomenclatural changes in the names currently applied to Southern Rhodesian trees.

This check list is therefore a critical compilation of all correct names of local trees as published in these various floras, and as applied to local records, prepared after an examination of specimens more particularly at Pretoria, Kitwe, and Kew, and of the determinations made upon them there.

It should be emphasised that this list is clearly not a definitive taxonomic work, and any taxonomic judgements have, as far as possible, been avoided. Such judgements cannot however always be by-passed, and in the few cases where such a judgement has had to be made, the splitters rather than the lumpers have been favoured. Thus for example while Codd in the Flora of Southern Africa considers that *Randia vestita* S. Moore is conspecific with *Xerompsis obovata* (Hochst.) Keay, there seems in Southern Rhodesia at the moment to be sufficient difference between gatherings of the one or the other to maintain these two taxa as separate species, although the assembly of many further collections may ultimately demonstrate these differences to be non-existent. Meanwhile, therefore, it seemed better in this region to keep the two taxa separate, but as *Randia vestita* has not been transferred to *Xerompsis*, which has to be done if it is to be maintained as a separate species, *R. vestita* has been cited in the list as *Xerompsis vestita* comb. nov. In rather the same way, Codd in volume 26 of the Flora of Southern Africa (1963) transfers two South African species of *Conopharyngia* to *Tabernaemontana*; this leaves two Southern Rhodesian species to be listed again under *Tabernaemontana*.

There are other similar taxonomic and nomenclatural complexities connected with the employment of names used in the latest floras. Moreover while White in his Forest Flora of Northern Rhodesia (1962) omits reference to most infra-specific categories, perhaps somewhat inconsistently he has occasionally reduced what might have been regarded as good species to sub-specific rank, as in the case of *Syzygium guineense*, thereby creating a large and widely diversified species. Such lumping is perhaps a phase imposed by circumstances during the preparation in the first half of this century of African regional floras, principally in European Herbaria, and we may already be emerging from this phase and moving towards a more narrow conscription of species which may lead to the resurrection of some of these older species at the moment regarded as of sub-specific rank. It seems clear that *Terminalia sericea* agg., for example, must be broken down again into at least three distinct taxa, and many similar instances could be quoted. This lumping phase, however inconvenient and unwieldy for the non-specialist, will at least have been useful to future cyto-taxonomists and biogeographers, providing them as it does with starting points for the examination of vicariant relationships and so forth.

This present tree list contains some 735 taxa of which there are 714 species, with 279 genera in 76 families. Because many of the names listed will be strange to persons otherwise familiar with the vegetation of this country, a selected list of synonyms has been provided. It is not intended to represent the full range of synonomy for this area, but only to indicate the commoner synonyms by which certain of the taxa listed have previously been known, that is names which have been widely used and which appear in some of the more familiar local literature. These synonyms thus include for example names used in Henkel's early account of the vegetation of Southern Rhodesia (1931), Eyles' list of Rhodesian plants (1916), Stedman's list of woody species (1933), the Coates-Palgrave illustrated tree book (1956) and so forth. For convenient reference, the genera of both currently correct epithets and of these selected synonyms are listed in the index, and it is only necessary to turn to the page of the appropriate genus in the list and look through the correct names and the synonyms to trace a given taxon.

As most of the floras and herbaria of this part of the world are arranged according to the Engler and Diels system, or some modification of it, this arrangement of families has in general been followed here. Taxonomists are at the moment in something of a quandary in regard to such classification. Most of the larger continental European and American herbaria are also arranged on this Engler and Diels system. Many British herbaria follow Bentham and Hooker; several important herbaria in Southern Africa utilise the numerical system laid down by Dalle Torre and Harms which is basically still Engler and Diels. The system of Hutchinson, which seems to be at the moment the most natural system, bringing out the most clearly the inter-relationships between the different families, will have to be modified in the future, as it cannot be accepted as it stands, and there seems little point in changing over to it until this has happened and some stability has been achieved.

A list like this, therefore, necessarily rests on a rather arbitrary basis in several respects, but it is hoped that nevertheless it will be of some service as a guide to what is at present known about the occurrence of trees in this territory, and that it may assist in the eventual production of a definitive tree list for the area.

Where a tree occurs commonly, no specimens are cited; it is unlikely that such well-known species have been mis-identified, and further name changes will merely reduce the currently correct name to synonymy where it can readily be traced. In the case of single records however, or of a taxon with a few gatherings only, the specimens in question have been cited, together with their locality, or a selection of specimens listed where there are several from one locality. In such instances there is a very real possibility that the name presently applied is a mis-identification, which could only subsequently be detected during the preparation of revised lists if reference is made here to the specimens themselves.

Only specimens deposited in the Government Herbarium, Salisbury (SRGH), have been cited here; duplicates of these gatherings are in many instances to be found at Kew, Pretoria, in Lisbon and to a lesser extent in other internationally established herbaria. In the case of a few critical groups, for example as concerns *Terminalia sericea* agg., a full range of gatherings is to be found only in the Central African Herbarium (CAH) at the University College, Salisbury.

Introduced and naturalised species have deliberately been excluded from the list, but a very few records have been retained of trees which are doubtfully indigenous here. Thus *Erica arborea* is suspect, for it has been found in Southern Rhodesia so far only near occupied sites where it could have been introduced. It has always to be borne in mind that this country has a long tradition of enthusiastic amateur botany, which has led to the obtaining and establishment in gardens of much exotic material.

Appreciation must be recorded here for the permission of the respective Directors to examine specimens in the Herbarium of the Royal Botanic Gardens, Kew, the Herbarium of the Botanical Research Institute, Pretoria, the Phanerogamic Herbarium of the Paris Natural History Museum and the Government Herbarium, Salisbury, where Dr. H. Wild gave some most helpful advice and Mr. R. N. Drummond kindly undertook the correction of detectable errors in the list and provided a number of suggestions which resulted in additions to it. Mr. L. C. Leach has supplied the names of the succulent Euphorbiaceae.

LIST OF TREES

SALICACEAE

Salix capensis Thunb. var. gariepina Anders.

„ subserrata Willd.

MYRICACEAE

Myrica conifera Burm. f.
(*M. aethiopica* L.f.)

„ pilulifera Rendle

ULMACEAE

Celtis africana Burm. f.
(*C. kraussiana* Bernh.)
(*C. rhamnifolia* Presl.)

„ durandii Engl.
(*C. dioica* S. Moore)

Chaetacme arista Planch.
Umtali, *Chase* 7, 648, etc.:
Chipinga, *Farrell* 193.
(*C. microcarpa* Rendle)
(*C. serrata* Engl.)

Trema orientalis Bl.
(*T. guineensis* Priemer)

MORACEAE

Bosquiea phoberos Baill.

Ficus brachypoda Hutch.

„ brachylepis Welw. ex Hiern
Chirinda Forest, *Wild* 214, etc.

„ burkei (Miq.) Miq.
(*F. erici-rosenii* R.E. Fr.)

„ capensis Thunb.

„ capreifolia Del.

„ cognata N.E. Br.
Bulawayo, *Eyles* 7,008

„ congensis Engl.

Ficus craterostoma Warb.

„ dekdekena (Miq.) A. Rich.

„ eriocarpa Warb.

„ exasperata Vahl.
Melsetter, *Eyles* 6,282, etc.

„ glumosa Del.
Chipinga, *Goldsmith* 198/62:
Lomagundi, *Jack* 1,239

„ gnaphalocarpa (Miq.) Steud. ex A. Rich.

„ gossweileri Hutch.

„ holstii Warb. ex Desn.
Inyanga, *Chase* 1,837 (27,034)

„ ingens (Miq.) Miq.

„ ingentoides Hutch.

„ mallotocarpa Warb.

„ natalensis Hochst.
(*F. schimperi* R.E. Fr.)
(*F. vogelii* R.E. Fr.)

„ nekbuda Warb.

„ nigropunctata Warb.

„ pretoriae Burtt Davy

„ quibeba Welw. ex Ficalho

„ retusa L.

„ rhodesiaca Warb. ex Mildbr. & Burret

„ rubiginosa Vent.
Bulawayo, *Hodgson* 1/55

„ smutsii Verdoorn

„ soldanella Warb.

„ subcalcarata Warb. & Schweinf.
Chirinda Forest, *Swynnerton* 435:
Eastern Districts, *Hodgson* s.n.:
Umtali, *Chase* 1,837

„ stuhlmannii Warb.

„ sycomorus L.

Ficus thonningii Blume

,, vallis-choudae Del.

,, verruculosa Warb.

,, welwitschii Warb.
Sabi-Lundi Junction, *Plowes* 1,172

,, zambesica Hutch.

Maclura africana (Bur.) Corner
(*Cardiogyne africana* Bur.)

Myrianthus holstii Engl.
(*M. arboreus* Beauv.)

PROTEACEAE

Faurea discolor Welw.

,, forficuliflora Bak.

,, saligna Harv.

,, speciosa Welw.

Leucadendron petiolare Hiern
(*Protea petiolaris* Baker)

Protea angolensis Welw. var. angolensis
(*Leucadendron angolense* Hiern.)

,, angolensis Welw. var. divaricata
(Engl. & Gilg) Beard
(*P. denudata* Hutch. & Bruce)

,, gaguedii Gmel.
(*P. abyssinica* Willd.)
(*P. trigyna* Phyllips)

,, gazensis Beard

,, madiensis Oliv.
(*P. bequaertii* De Wild.)

,, welwitschii Engl. subsp.
goetzeana (Engl.) Beard
(*P. kirkii* G. H. Wright)
(*P. hirta* Klotzsch pro parte)
(*P. swynnertonii* S. Moore)

,, welwitschii Engl. subsp. melliodora
(Engl. & Gilg) Beard
(*P. hirta* Klotzsch pro parte)
(*P. melliodora* Engl. & Gilg)

OPILIACEAE

Opilia tomentella (Oliv.) Engl.

OLACACEAE

Olax dissitiflora Oliv.

,, obtusifolia De Wild.

Strombosia scheffleri Engl.
Chirinda Forest, *Wild* 2,032

Ximenia americana L.

,, caffra Sond. var. caffra

ANNONACEAE

Annona senegalensis Pers.
(*A. chrysophylla* Boj.)

Artabotrys brachypetalus Benth.

,, monteiroae Oliv.
(*A. nitidus* Engl.)

Cleistochlamys kirkii (Benth.) Oliv.

Hexalobus monopetalus (A. Rich.)
Engl. & Diels var. monopetalus

,, monopetalus (A. Rich.) Engl.
& Diels var. obovatus Brenan

Monodora junodii Engl. & Diels

Popowia obovata (Benth.) Engl. & Diels

Uvaria gracilipes N. Robson
Lundi R., *Phelps* 207

Xylopia aethiopica (Dunal) A. Rich.
Inyanga, *Wild* 5,267

,, holtzii Engl.
(*X. antunesii* var. *shirensis*
Engl. & Diels)

,, odoratissima Welw. ex Oliv.
(*X. antunesii* Engl. & Diels)

,, tomentosa Exell

MONIMIACEAE

Xymalos monospora (Harv.) Baill.

HERNANDIACEAE

Gyrocarpus americanus Jacq.
(*G. jacquinii* Roxb.)
(*G. asiaticus* Willd.)

CAPPARIDACEAE

Boscia albitrunca (Burch.) Gilg & Bened.

,, angustifolia A. Rich. var.
corymbosa (Gilg) De Wolf.
(*B. corymbosa* Gilg)

,, matabelensis Pest.

,, mossambicensis Klotzsch

,, rehmanniana Pest.

,, salicifolia Oliv.

Cladostemon kirkii (Oliv.) Pax & Gilg

Maerua angolensis DC.

,, caffra (DC.) Pax.

,, kirkii (Oliv.) F. White

,, prittwitzii Gilg. & Bened.
Urungwe, *Lovemore* 32: Gwaai, *Davies* 398

,, pubescens (Klotzsch) Gilg

Ritchiea albersii Gilg

Thylacium africanum Lour.
(*T. verrucosum* Klotzsch)

PITTOSPORACEAE

Pittosporum viridiflorum Sim var.
malosanum (Bak.) Cufodontis

,, viridiflorum Sim var.
viridiflorum

ROSACEAE

Parinari curatellifolia Planch. ex Benth.
subsp. mobola (Oliv.) R. Grah.
(*Parinarium curatellaefolium* Planch.)
(*Parinarium mobola* Oliv.)

Parinari polyandra Benth. subsp. floribunda (Bak.) R. Grah.

Pygeum africanum Hook. f.

CONNARACEAE

Agelaea heterophylla Gilg

Byrsocarpus orientalis (Baill.) Bak.

MIMOSACEAE

Acacia abyssinica Hochst. ex Benth. subsp.
calophylia Brenan

,, albida Del.

,, arenaria Schinz.

,, ataxacantha DC. var. ataxacantha

,, ataxacantha DC. var. australis Burtt Davy
(*A. eriadenia* Benth.)
(*A. lugardae* N.E.Br.)

,, borleae Burtt Davy

,, caffra (Thunb.) Willd.

,, chariessa Milne-Redhead

,, clavigera E. Mey. subsp. clavigera

,, clavigera E. Mey subsp. usambarensis (Taub.) Brenan

,, davyi N.E.Br.
Nyamandhlovu, *West* 2,421

,, delagoensis Harm.

,, eriocarpa Brenan

,, erubescens Welw. ex Oliv.

,, fleckii Schinz.

,, galpinii Burtt Davy

,, gerrardi Benth. var. gerrardi

,, giraffae Willd.

,, goetzei Harms subsp. goetzei

,, goetzei Harms subsp. microphylla
Brenan

,, grandicornuta Gerstner

,, hebeclada DC.

,, karroo Hayne
(*A. natalita* E. Mey.)

,, kirkii Oliv. subsp. kirkii var. intermedia Brenan

,, macrothyrsa Harms
(*A. buchananii* Harms)
(*A. prorsispinula* Stapf.)

Acacia mellifera (Vahl) Benth. subsp. detinens (Burch.) Brenan
(*A. detinens* Burch.)

,, nebrownii Burtt Davy

,, nigrescens Oliv.
(*A. pallens* (Benth.) Rolfe)

,, nilotica (L.) Willd. ex Del. subsp. kraussiana (Benth.) Brenan
(*A. benthami* Rochebr.)

,, nilotica (L.) Willd. ex Del. subsp. subalata (Vatke) Brenan

,, permixta Burtt Davy

,, polyacantha Willd. subsp. campylacantha (Hochst. ex A. Rich.) Brenan
(*A. campylacantha* Hochst.)

,, rehmanniana Schinz.

,, robusta Burch.

,, senegal (L.) Willd. var. leiorhachis Brenan
(*A. verek* Guill. & Perr.)

,, senegal (L.) Willd. var. rostrata Brenan

,, sieberiana DC. var. vermoesenii (De Wild.) Keay & Brenan

,, sieberiana DC. var. woodii (Burtt Davy) Keay & Brenan
(*A. woodii* Burtt Davy)

,, stuhlmannii Taub.

,, tortilis (Forsk.) Hayne subsp. heteracantha (Burch.) Brenan

,, tortilis (Forsk.) Hayne subsp. spirocarpa (Hochst. ex A. Rich.) Brenan

,, uncinata Engl.

,, xanthoploea Benth.

Albizia adianthifolia (Schumach.) W. F. Wight
(*A. fastigiata* (E. Mey.) Oliv.)

,, amara (Roxb.) Boiv. subsp. seriocephala (Benth.) Brenan

Albizia anthelmintica (A. Rich.) Brongn.

,, antunesiana Harms

,, brevifolia Schinz.
(*A. rogersii* Burtt Davy)

,, evansii Burtt Davy

,, forbesii Benth.

,, glaberrima (Schumach. & Thonn.) Benth. var. glabrescens. (Oliv.) Brenan

,, gummifera (J. F. Gmel.) C. A. Smith var. gummifera.

,, harveyi Fourn.

,, schimperana Oliv.

,, tanganyicensis Bak. f.
(*A. rhodesica* Burtt Davy)

,, versicolor Welw. ex Oliv.

,, zimmermanii Harms

Amblygonocarpus andogensis (Welw. ex Oliv.) Exell & Torre
(*A. obtusangulus* (Welw. ex Oliv.) Harms)

Dichrostachys cinerea (L.) Wight & Arn. subsp. cinerea
(*D. glomerata* (Forsk.) Chiov.)
(*D. nutans* (Pers.) Benth.)

,, cinerea (L.) Wight & Arn. subsp. nyassana (Taub.) Brenan
(*D. nyassana* Taub.)

Elephantorrhiza burkei Benth.

,, goetzii (Harms) Harms
(*Piptadenia goetzii* Harms)

Entada abyssinica Steud. ex A. Rich.

Newtonia buchanani (Bak.) Gilbert & Boutique
(*Piptadenia buchanani* Bak.)

,, glandulifera (Pell.) Gilb. & Bout.
Ndanga, *Goodier* 1,015

,, hildebrandtii (Vatke) Torre var. hildebrandtii
(*Piptadenia hildebrandtii* Vatke)

Xylia torreana Brenan

CAESALPINIACEAE

Afzelia quanzensis Welw.

Baikiaea plurijuga Harms

Bauhinia galpinii N.E.Br.
(*B. punctata* Bolle)

„ macrantha Oliv.

„ mendoncae Torre & Hillcoat

„ petersiana Bolle

Brachystegia allenii Hutch. & Burtt Davy

„ boehmii Taub.
(*B. woodiana* Harms)

„ spiciformis Benth.
(*B. randii* Bak. f.)

„ tamarindoides Welw. ex Benth.

„ utilis Hutch. & Burtt Davy

Burkea africana Hook.

Cassia abbreviata Oliv. subsp. bearana (Holmes) Brenan
(*C. granitica* Bak. f.)

„ singueana Del.

Colophospermum mopane (Kirk ex Benth.) Kirk ex J. Léon.
(*Copaifera mopane* Kirk ex Benth.)

Cordyla africana Lour.

Dialium angolense Welw. ex Oliv.

„ englerianum Henriques
(*D. simsii* Phillips)

Erythrophleum africanum (Welw. ex Benth.) Harms
(*Gleditsia africana* Welw.)

„ suaveolens (Guill. & Perr.) Brenan
(*E. guineense* G. Don)

Guibourtia coleosperma (Benth.) J. Léon.
(*Copaifera coleosperma* Benth.)

„ conjugata (Bolle) J. Léon
(*Copaifera gerskiana* Benth.)
(*C. conjugata* (Bolle) Milne-Redhead)

Julbernardia globiflora (Benth.) Troupin
(*Berlinia globiflora* Hutch. & Burtt Davy)
(*Isoberlinia globiflora* Hutch. ex Greenway)

Peltophorum africanum Sond.

Piliostigma thonningii (Schum.) Milne-Redhead
(*Bauhinia thonningii* Schum.)
(*B. articulata* DC.)

Swartzia madagascariensis Desv.

Tamarindus indica L.

PAPILIONACEAE

Baphia obovata Schinz

Bolusanthus speciosus (Bolus) Harms

Calpurnea subdecandra (L'Herit.) Schweick.
(*Calpurnea aurea* (Lam.) Benth.)

Craibea brevicaudata (Vatke) Dunn subsp. baptistanum (Buttn.) Gillet
(*Schefflerodendron gazensis* Bak. f.)

Dalbergia arbutifolia Bak.

„ boehmii Taub.

„ lactea Vakte
Inyanga, *Eyles* 2,604, etc.; Hondi Valley, *Chase* 1,497; Gungungana Forest, *Goldsmith* 103/61, *Goldsmith* 66/61; Umtali, *Chase* 923, etc.

„ martinii F. White
(*D. glandulosa* Dunkley)

„ melanoxylon Guill. & Perr.

„ nitidula Welw. ex Bak.

Dalbergiella nyassae Bak. f.

„ welwitschii Bak. f.
Urungwe, *Goodier* 580, *Goodier* 601; Buhera, Gleghorn 550.

Erythrina abyssinica Lam. ex DC.
(*E. tomentosa* R.Br. ex A. Rich.)

„ gibbsae Bak. f.

Erythrina livingstoniana Bak.
(*E. droogmansiana* De Wild. & Disr.)

,, lysistemon Hutch.
(*E. caffra* Thunb.)

Indigofera rhynchocarpa Welw. ex Bak. var. rhynchocarpa

Lonchocarpus capassa Rolfe

,, menyhartii Schinz

Milletia stuhlmannii Taub.

,, usaramensis Taub. subsp. australis Gillet

,, sp., aff. M. drastica Welw.
Victoria, *Hodgson* s.n.

Mundulea sericea (Wild.) Greenway
(*M. suberosa* Benth.)

Ormocarpum bibracteatum (Steud. ex A. Rich.) Bak.
,, (*O. kirkii* S. Moore)

,, trichocarpum (Taub.) Harms ex Burtt Davy

Ostryoderris stuhlmannii (Taub.) Dunn ex Bak. f.

Pericopsis angolensis (Bak.) van Meeuwen
(*Afrormosia angolensis* (Bak.) Harms)

Pseudocadia zambesica (Bak.) Harms
(*Sophora zambesiaca* Bak.)

Pterocarpus angolensis DC.
(*P. erinaceus* Poir.)
(*P. echinatus* DC.)

,, antunesii (Taub.) Harms
(*P. stevensonii* Burtt Davy)

,, brenanii Barbosa & Torre

,, martinii Dunkley

,, polyanthus Harms

,, rotundifolius (Sond.) Bruce

Sesbania cinerascens Welw. ex Bak.

,, macrantha Welw. ex Phill. & Hutch. var. levis Gillet

Sesbania macrantha Welw. ex Phill. & Hutch var. macrantha

,, sesban (L.) Merr. subsp. sesban var. nubica Chiov.

HUGONIACEAE

Hugonia orientalis Engl.
Chipinga, *Goodier* 100:
Nuanetsi, *Davies* 1,627.

ERYTHROXYLACEAE

Erythroxylum emarginatum Thonn.

,, zambesiacum N. Robson

BALANITACEAE

Balanites aegyptiaca (L.) Del.

,, maughamii Sprague

,, pedicellaris Mildbr. & Schlechter

RUTACEAE

Calodendron capense (L.f.) Thunb.

Citropsis daweana Swingle & Kellern

Clausena anisata (Willd.) Hook. f. ex Benth.
(*C. inaequalis* Benth.)

Fagara capensis Thunb.
(*Xanthoxylum capense* Harv.)

,, chalybea (Engl.) Engl.

,, davyi Verdoorn

,, humilis E. A. Bruce

,, macrophylla (Oliv.) Engl.

Fagaropsis angolensis (Engl.)
Dale var. millis (Suess.) Mendoçae
(*Clausenopsis angolensis* Engl.)

Oricia swynnertonii (Bak. f.) Verdoorn
Chirinda Forest, *Swynnerton* 12:
Zimbabwe, *Wild* 3,012
(*Teclea swynnertonii* Bak. f.)

Teclea nobilis Del.
Chimanimani, *Swynnerton* 1,322: Chirinda Forest, *Swynnerton* 2,163
(*Teclea natalensis* Bak. f.)
(*T. welwitschii* (Hiern.) Verdoorn pro parte)

Vepris reflexa Verdoorn

,, zambesiaca S. Moore
Urungwe, *Griffiths* s.n.: Bubi, *Goldsmith* 84/56: Beit Bridge, *Whellan* 1,670

SIMAROUBACEAE

Kirkia acuminata Oliv.

BURSERACEAE

Commiphora africana (A. Rich.) Engl. var. africana
(*C. pilosa* Engl.)

,, africana var. rubriflora (Engl.) Wild

,, angolensis Engl.

,, caerulea Burtt
Kariba, *Goldsmith* 52/59

,, edulis (Klotzsch) Engl.

,, karibensis Wild

,, marlothii Engl.

,, merkeri Engl.
(*C. viminea* Burtt Davy)

,, mollis (Oliv.) Engl.

,, mossambicensis (Oliv.) Engl.
(*C. fischeri* Engl.)

,, pyracanthoides Engl. subsp. glandulosa (Schinz) Wild

,, pyracanthoides subsp. pyracanthoides
Beitbridge, E. M. & W. 458: *Davies* D. 2,841, etc.: Gwanda, *Plowes* 1,194

,, schimperi (Berg.) Engl.

Commiphora tenuipetiolata Engl.

,, ugogensis Engl.

,, zanzibarica (Baill.) Engl.

MELIACEAE

Ekebergia benguelensis Welw. ex C.D.C.
(*E. arborea* Bak. f.)

,, capensis Sparrm.
(*E. rueppelliana* (Fresen.) A. Rich.)
(*E. meyeri* Presl.)

Entandrophragma caudatum (Sprague) Sprague

Khaya nyasica Stapf. ex Bak. f.
(*K. senegalensis* A. Juss.)

Lovoa swynnertonii Bak f.
Chirinda Forest, *McGregor* 16, etc.

Trichilia capitata Klotzsch

,, dregeana Sond.
Chirinda Forest, *Wild* 2,057
(*T. chirindensis* Swyn. & Bak. f.)

,, emetica Vahl
(*T. roka* [Forsk.] Chiov.)

Turraea fischeri Gurke subsp. eylesii (Bak. f.) Styles & White
Matopos, *Hodgson* 15/48

,, floribunda Hochst.

,, nilotica Kotschy & Peyr.

,, zambesiaca Sprague & Hutch.

POLYGALACEAE

Polygala virgata Thunb. var. decora (Sond.) Harv.

Securidaca longipedunculata Fresen.

EUPHORBIACEAE

Alchornea glabrata Prain
Chirinda Forest, *Wild* 2,167: Inyanga, *Chase* 7,862

Alchornea laxiflora (Benth.) Pax & K. Hoffm.

Androstachys johnsonii Prain

Antidesma membranacea Meull. Arg.

,, venosum E. Mey. ex Tul.

Argomuellera macrophylla Pax
Chirinda Forest, *Pardy* & *Armitage* 2 and 15

Bridelia atroviridis Muell. Arg.
Chirinda Forest, *R. Hack* 161/50

,, cathartica Bertol. f. subsp. melanthoides (Klotzsch) J. Léon.
(*B. niedenzui* Gehrm.)

,, micrantha (Hochst.) Baill.

,, mollis Hutch.

Cleistanthus apetalus S. Moore
Inyanga, *Chase* 7,859: Umtali, *Chase* 5,551: Melsetter, *Goldsmith* 106/61

,, holtzii Pax

Croton gratissimus Burch.
(*C. zambesicus* Muell. Arg.)

,, madandensis S. Moore

,, megalobotrys Muell. Arg.

,, menyharthii Pax

,, pseudopulchellus Pax

,, sylvaticus Hochst. ex Krauss

Drypetes gerrardii Hutch.
Ndanga, *Gibson* 74/51: etc.: Umtali, *Chase* 5,594: Chirinda Forest, *Chase* s.n.
(*D. battiscombei* Hutch.)

,, mossambicensis Hutch.

,, natalensis (Harv.) Hutch.

Erythrococca menyharthii (Pax) Prain
(*Claoxylon menyharthii* Pax)

,, polyandra (Pax & Hoffm.) Prain

,, tristis Prain
Lalapansi, *McGregor* s.n.

Excoecaria madagascariensis (Baill.) Muell. Arg.
Chirinda Forest, *Goldsmith* 226/62, *Hack* 59/50, *Swynnerton* 72, etc.

Euphorbia angularis Klotzsch

,, confinalis Dyer

,, cooperi N.E.Br.

,, cooperi N.E. Br. var. ined.

,, espinosa Pax

,, griseola Pax

,, ingens Mey.

,, matabelensis Pax

Hymenocardia acida Tul.
(*H. mollis* Pax)

,, ulmoides Oliv.

Macaranga capensis (Baill.) Sim

,, kilimandscharica Pax
Umtali, *S.R. Dept. Agr.* 1,178

,, mellifera Prain

,, ruwenzorica Pax
Inyanga, *Eyles* 2,579

,, zenkeri Pax
Eastern Border, *Gilliland* 966

Neopalissya castaneifolia Pax
Chirinda Forest, *Pardy* & *Armitage* 2 and 15

Phyllanthus discoideus (Baill.) Meull. Arg.

,, engleri Pax

,, kirkianus Muell. Arg.

,, reticulatus Poir

,, sp., c.f.P. inflatus Hutch.
Chirinda Forest, *Goldsmith* 21/61, *Wild* 2,046

Pseudolachnostylis dekindtii Pax
Chipinga, *Swynnerton* 151: Bulawayo, *Cuthbertson* 2 and 3

,, maprouneifolia Pax

Ricinodendron rautenii Schinz.

Sapium bussei Pax

„ ellipticum (Hochst. ex Krauss) Pax

Securinega virosa (Roxb. ex Willd.) Pax & K. Hoffm.
(*Fluggea microcarpa* Blume)

Suregada procera (Prain) Croizat
Melsetter, *Goodier* 146: Umtali, *Chase* 3,733: Chipete, *Wild* 2,133: Chirinda Forest, *Wild* 2,045, etc.

Synadaenium cupulare (Boissier) Wheeler

„ kirkii N.E.Br.

Tannodia swynnertonii (S. Moore) Prain
Chirinda Forest, *Swynnerton* 1,096, etc.

Uapaca kirkiana Muell. Arg.

„ nitida Muell. Arg.

„ sansibarica Pax

ANACARDIACEAE

Heeria insignis (Del.) O. Kuntze

„ reticulata (Bak. f.) Engl.

Lannea discolor (Sond.) Engl.

„ kirkii Burtt Davy

„ schimperi (Hochst. ex A. Rich.) Engl.

„ stuhlmannii (Engl.) Engl. var tomentosa Dunkley

Rhus amerina Meikle

„ dentata Thunb.

„ glaucescens A. Rich.
Ndanga, *West* 3,959: Marandellas, *S.R. Dept. Agri.* 868 Marandellas

„ guenzii Sond.

„ incana Mill.
(*R. laevigata* L.)
(*R. villosa* L.f.)

Rhus lancea L.f.

„ legati Schoenl.

„ longipes Engl.

„ macowani Schoenl.

„ pyroides Burch.

„ quartiniana A. Rich. var. acutifoliolata (Engl.) Meikle

„ tenuinervis Engl. & Gilg

„ tomentosa L.

Sclerocarya caffra Sond.

AQUIFOLIACEAE

Ilex mitis (L.) Radlk.

CELASTRACEAE

Cassine aethiopica Thunb.
(*Mystroxylon aethiopicum* (Thunb.) Loes.)
(*Elaeodendron aethiopicum* (Thunb.) Oliv.)
(*Cassine velutinum* (Harv.) Loes.)
(*Elaeodendron velutinum* Harv.)

„ buchananii Loes.
(*Elaeodendron buchananii* Loes.)

Catha edulis Forsk.

Maytenus acuminatus (L.f.) Loes.
(*Gymnosporia acuminata* (L.f.) Loes.)
(*G. amaniensis* Loes.)

„ cymosus (Soland.) Exell

„ mossambicensis (Klotzsch) Blakelock var. mossambicensis

„ senegalensis (Lam.) Exell
(*Gymnosporia buxifolia* (L.) Szysz.)
(*G. senegalensis* Loes.)

„ undatus (Thunb.) Blakelock
(*Gymnosporia luteola* (Del.) Loes.)
(*G. undata* (Thunb.) Szysz.)

Pleurostylia africana Loes.

Pseudocassine transvaalensis (Burtt Davy) Bredell

SALVADORACEAE

Salvadora angustifolia Turrill var. australis (Schweick.) Verdoorn
(*S. australis* Schweick.)

ICACINACEAE

Apodytes dimidiata E. Mey. subsp. dimidiata

Cassinopsis ilicifolia (Hochst.) Kuntze
(*C. capensis* Harv. & Sond.)

,, tinifolia Harv.

SAPINDACEAE

Allophylus buchananii Gilg. ex Radlk.

,, chirindensis Bak. f.
Melsetter, *Goldsmith* 125/62

,, griseo-tomentosus Gilg

,, holubii Bak.f.

,, rubrifolius (Hochst.) Engl.

Aporrhiza nitida Gilg.
Melsetter, *Ball* 751

Blighia unijugata Bak.
(*B. zambesiaca* Bak.)
(*Phialodiscus unijugatus* (Bak.) Radlk.)
Melsetter, *Ball* 750, etc.: Umtali, *Chase* 7,408, etc.

Deinbollia xanthocarpa (Klotzsch) Radlk.

Dialopsis africana (L.) Radlk.

Dodonea viscosa (L.) Radlk.

Filicium decipiens (Wight & Arn.) Thwaite. Chipinga, *Goldsmith* 68/62: Inyanga. *Plowes* 2,047, etc.: Chimanimani, *West* 3,680: Umtali, *Chase* 743, etc.

Lecaniodiscus fraxinifolius Bak.

Melanodiscus oblongus Radlk.
Melsetter, *Ball* 811, etc.: Umtali, *Chase* 4,697, etc.: Chipinga, *Goldsmith* 47/62

Pappea capensis (Spreng.) Eckl. & Zeyh. var. radlkoferi Schinz

Stadmannia sideroxylon DC.
Umtali, *Chase* 4,733, etc.

Zanha golungensis Hiern
Melsetter, *Goodier* & *Phipps* 156: Gungunyana Forest Reserve, *Goldsmith* 27/62: Umtali, *Chase* 1,228.

MELIANTHACEAE

Bersama abyssinica Fres. subsp. paullinioides (Planch) Verdcourt
(*B. nyassae* Bak.)

RHAMNACEAE

Lasiodiscus usambarensis Engl.
Chirinda Forest, *Wild* 2,179

Phyllogeiton discolor (Klotzsch) Herzog
(*Berchemia discolor*(Klotzsch Hemsley)

,, zeyheri (Sond.) Suesseng.
(*Rhamnus zeyheri* Sond.)

Rhamnus prinoides L'Herit

,, staddo A. Rich.

Ziziphus abyssinica Hochst. ex A. Rich.

,, mauritiana Lam.

,, mucronata Willd.

,, mucronata Willd. var. ined.

VITACEAE

Rhoicissus revoilii Planch.
(*R. cuneifolia* Planch.)

TILIACEAE

Grewia avellana Hiern
(G. calycina N.E.Br.)

,, bicolor Juss.

,, flava DC.
(*G. cana* Sond.)

,, flavescens Juss. var. flavescens

,, flavescens Juss. var. clukondae (Schinz.) Wild

,, hexamita Burret
(*G. messinica* Burtt Davy)

,, inaequilatera Garcke

,, lepidopetala Garcke

,, micrantha Boj.

,, microcarpa K. Schum.

,, monticola Sond.

,, occidentalis L. var. occidentalis
(*G. chirindae* Bak. f.)
(*G. microphylla* Weim.)

,, pachycalyx K. Schum.

,, praecox K. Schum.
(*G. congesta* Weim.)

,, schinzii K. Schum.

,, stolzii Ulbr.
(*G. hopkinsii* Suess & Merxm.)

,, subspathulata N.E.Br.

MALVACEAE

Azanza garckeana (P. Hoffm.) Exell & Hillcoat
(*Thespesia garckeana* F. Hoffm.)

Hibiscus burt-davyi Dunkley
Melsetter, *Thompson* 10

,, diversifolius Jacq. subsp. rivularis (Brem. & Oberm.) Exell.

BOMBACACEAE

Adansonia digitata L.

STERCULIACEAE

Cola greenwayi Brenan
Vumba, Wild 1,588

Dombeya burgessiae Gerr. ex Herv.
(*D. rosea* Bak. f.)

,, kirkii Mast.

,, rotundifolia (Hochst.) Planch.
(*D. reticulata* K. Schum.)

Sterculia africana (Lour.) Fiori

,, quinqueloba (Garcke) K. Schum.
(*S. Livingstoneana* Engl.)

,, rogersii N.E.Br.

Triplochiton zambesiacus Milne-Redhead

OCHNACEAE

Brakenridgea zanguebarica Oliv.
Umtali, *Chase* 5,816

Ochna barbosae N. Robson
Chipinga, *Phelps* 257: S. Nuanetsi, *Mowbray* 119

,, cyanophylla N. Robson
(*O. mechowiana* Palgrave)

,, glauca Verdoorn

,, holstii Engl.
(*O. chirindica* Bak. f.)

,, inermis (Forsk.) Schweinf.

,, leptoclada Oliv.

,, occonnorii Phillips
Chirinda Distr., *Wild* 2,137

,, polyneura Gilg.
Umtali, *Chase* 1,258

,, puberula N. Robson

,, pulchra Hook. subsp. pulchra
(*O. antunesii* Engl. & Gilg)

,, schweinfurthiana F. Hoffm.

GUTTIFERAE

Garcinia huillensis Welw. ex Oliv.
(*G. buchananii* Bak.)

,, livingstonei T. Anders.
(*G. angolensis* Vesque)

,, mlanjiensis Dunkley

Harungana madagascariensis Lam. ex Poir.
(*Haronga paniculata* (Pers.) Lodd ex Steud.)

Hypericum revolutum Vahl
(*H. leucoptychodes* Steud. ex A. Rich.)
(*H. lanceolatum* Lam.)

,, roeperanum Schimp. ex A. Rich.
(*H. quartinianum* Steedman)

Psorospermum febrifugum Spach.

Symphonia globulifera L.f.

DIPTEROCARPACEAE

Monotes glaber Sprague
(*M. africanus* var. *denudans* Eyles)

,, engleri Gilg
(*M. tomentellus* Hutch.)
(*M. hypoleucus* Eyles)

,, katangensis (De Wild.) De Wild.
Urungwe, *Goodier* 581

VIOLACEAE

Rinorea convallarioides (Bak.f.) Eyles
Chirinda Forest, *Chase* 495

,, ferruginea Engl.
(*R. gazensis* (Bak.f.) Brandt)
Chirinda Forest, *Wild* 2,219

FLACOURTIACEAE

Aphloia theiformis (Vahl) Benn.
(*Neumannia theaeformis* Benn.)
(*Alphloia myrtiflora* Galpin)

Bivinia jalbertii Tul.

Casearia battiscombei R. E. Fries
Chirinda Forest, *Wild* 2,113, etc.
Banti Forest Reserve, *English* 18/47
(*C. chirindensis* Engl.)

Dovyalis caffra (Hook. f. & Harv.) Warb.

,, hispidula Wild
Chipinda Gorge, *Davies* 2,197

,, lucida Sim

,, macrocalyx (Oliv.) Warb.
(*D. chirindensis* Engl.)
(*Aberia macrocalyx* Oliv.)

,, zeyheri (Sond.) Warb.
(*D. tristis* (Sond.) Warb.)

Flacourtia indica (Burm. f.) Merr.
(*F. hirtiuscula* Oliv.)
(*F. ramontchi* L'Herit.)

Homalium abdessammadii Aschers. & Schweinf. subsp. wildemanianum (Gilg.) Wild
Victoria Falls, *Wild* 3,170

,, chasei Wild

,, dentatum (Harv.) Warb.

Kiggelaria africana L.

Oncoba spinosa Forsk.

Rawsonia lucida Harv. & Sond.

Scolopia zeyheri (Nees) Szyszyl.
Salisbury, *Eyles* 6,326

Trimeria rotundifolia (Hochst.) Gilg

PASSIFLORACEAE

Adenia sp.

OLINIACEAE

Olinia ventosa (L.) Cuf.
Umvukwes, *Wild* 3,909, *Wild* 3,928

,, vanguerioides Bak.f.

THYMELAEACEAE

Peddiea africana Harv.
(*P. dregei* Meisn.)

LYTHRACEAE

Galpinia transvaalica N.E.Br.

RHIZOPHORACEAE

Cassipourea gerrardii (Schinz) Alston

„ gummiflua Tul. var. verticillata (N.E.Br.) J. Lewis
(*C. verticillata* N.E.Br.)

„ malosana (Baker) Alston

COMBRETACEAE

Combretum albopunctatum Susseng.

„ apiculatum Sond.

„ celastroides Welw.
(*C. patelliforme* Engl. & Diels)

„ eleagnoides Klotzsch

„ erythrophyllum (Burch.) Sond.

„ ghasalense Engl. & Diels
(*C. ternifolium* Engl. & Diels)

„ hereroense Schinz var. villosissimus Burtt Davy
(*C. rhodesicum* Bak.f.)
(*C. transvaalense* Schinz)

„ imberbe Wawra var. petersii Engl. & Diels
(*C. primigenium* Marloth & Engl.)
(*C. petersii* (Klotzsch) Engl.)

„ laxiflorum Welw. ex Laws.

„ mechowianum O. Hoffm.

„ microphyllum Klotzsch

„ molle R. Br.
(*C. gueinzii* Sond.)
(*C. holosericeum* Sond.)
(*C. splendens* Engl.)

„ mossambicense (Klotzsch)

„ padoides Engl. & Diels

„ psidioides Welw.
(*C. dinteri* Schinz)

Combretum tetrandum Exell

„ zeyheri Sond.
(*C. oblongum* F. Hoffm.)

Pteleopsis anisoptera (Welw.) Engl. & Diels

„ myrtifolia (Laws.) Engl. & Diels

Terminalia brachystemma Welw. ex Hiern

„ gazensis Bak.f.

„ kilimandscharica Engl.

„ mollis Laws.
(*T. suberosa* R.E.Fr.)
(*T. torulosa* F. Hoffm.)

„ prunioides Laws.

„ randii Bak.f.

„ sericea Burch.

„ silozensis Gibbs

„ stenostachya Engl. & Diels

„ stuhlmannii Engl.

„ trichopoda Diels

MYRTACEAE

Eugenia nyassensis Engl.
(*E. chirindensis* Bak.f.)

Syzygium cordatum, Hochst. ex Krauss
(*Eugenia cordata* Laws.)

„ guineense (Willd.) DC subsp. afromontanum F. White

„ guineense subsp. macrocarpum (Engl.) F. White

„ masukuense (Bak.) R. E. Fries

ARALIACEAE

Cussonia arborea Hochst.

„ kirkii Seen.

„ paniculata Edel & Zeyh.

Cussonia natalensis Sond.

,, spicata Thunb.

,, umbellifera Sond. var. umbellifera

Polyscias fulva (Hiern) Harms

,, malosana Harms

UMBELLIFERAE

Heteromorpha trifoliata (Wendl.) Edel & Zeyh.
(*H. arborescens* Cham. & Scht.)

Steganotaenia araliacea Hochst.

CORNACEAE

Afrocania volkensii (Harms) Hutch.
(*Cornus volkensii* Harms)

Curtisia faginea Ait.

ERICACEAE

Erica arborea L.
Umtali, *Chase* 7,786: Inyanga, *Chase* 544

Phillipia benguelensis (Engl.) Alm & Fries

,, hexandra S. Moore

,, mannii Hook. f.

,, norlindhii H. Weim.

MYRSINACEAE

Maesa lanceolata Forsk.

Myrsine africana L.

Rapanea ambratilis S. Moore
Melsetter, *Plowes* 1,223, etc.: Martin Forest Reserve, *McGregor* 41/48: Mt. Selinda, *Whellan* 257: Stapleford, *Guy* s.n.

,, melanophloeos (L.) Mey.

SAPOTACEAE

Bequaertiodendron maglismontanum (Son.) Heine & J. H. Hemsley
(*Chrysophyllum argyrophyllum* Hiern.)
(*C. maglismontanum* Sond.)
(*C. viridifolium* Wood & Franks)
(*Pouteria maglismontana* (Sond.) A. Meeuse)
(*Zeyherella maglismontana* (Sond.) Aubrev. & Pellegr.)

,, natalense (Sond.) Heine & J. H. Hemsley
(*Chrysophyllum natalense* Sond.)
(*Pouteria natalensis* (Sond.) Meeuse) Melsetter, *Swynnerton* 21

Chrysophyllum boivinianum (Pierre) Hemsley
(*C. gurungosanum* Engl.)

Lecomtedoxa henriquesii (Engl. & Warb.) A. Meeuse
(*Inhambanella henriquesii* (Engl. & Warb.) Dub)
(*Mimusops henriquesii* Engl. & Warb.) Gungunyana Forest, *Wild* 5,531, etc.: Chipinga, *Farrell* 201

Manilkara mochisia (Bak.) Dubard
(*M. aensiflora* (Engl.) Dale)
(*Mimusops mochisia* Bak.)
(*M. umbraculigera* Hutch. & Corb.)
(*Manilkara macaulayae* (Hutch. & Corb.) H. J. Lam.)

Mimusops caffra E. Mey. ex A.DC.

,, zeyheri Sond.
(*M. kirkii* Bak.)

Muriea discolor (Sond.) Hartog
(*Mimusops discolor* (Sond.) Hartog)

Pouteria brevipes (Bak.) Baehni
Melsetter, *Drummond* 5,001: Vumba, *Bell* 14: Chipinga, *Whellan* 133

Sideroxylon inerme L.

EBENACEAE

Diospyros abyssinica (Hiern) F. White
(*Maba mualala* Welw. ex Hiern)

Diospyros batocana Hiern

,, kirkii Hiern
(*D. platyphylla* Welw. ex Hiern)

,, lycioides Desf. subsp. sericea (Bernh.) de Winter
(*Royena pallens* Thunb.)
(*R. lycioides* (Desf.) A. DC. subsp. *seriacea* (Bernh.) de Winter)

,, mespiliformis Hochst. ex A.DC.
(*D. sabiensis* Hiern)

,, natalensis (Harv.) Brenan
(*D. dawei* (Hutch.) Brenan)

,, nummularia Brenan

,, quiloensis (Hiern) F. White

,, senensis Klotzsch

,, squarrosa Klotzsch

,, whyteana (Hiern) F. White
(*Royena whyteana* Hiern)
(*R. lucida* L.)

,, zombensis (B. L. Burtt) F. White

Euclea crispa (Thunb.) Guerke var. crispa

,, divinorum Hiern

,, linearis Zeyh. ex Hiern
(*E. eylesii* Hiern)

,, natalensis A.DC.
(*E. multiflora* Hiern)

,, schimperi (A.DC.) Dandy var. schimperi

,, undulata Thunb. var. undulata

OLEACEAE

Linociera battiscombei Hutch.
(*Dekindtia africana* Gilg)

Olea africana Mill.
(*O. chrysophylla* Lam.)
(*O. verrucosa* Link)

Schrebera alata (Hochst.) Welw.
(*S. merkeri* Lingelsh.)

Schrebera argyrotricha Gilg
(*S. mazoensis* S. Moore)

,, trichoclada Welw.
(*S. buchananii* Bak.)

LOGANIACEAE

Anthocleista grandiflora Gilg
(*A. zambesiaca* Bak.)

Buddleia salvifolia (L.) Lam.

Nuxia congesta R.Br. ex Fresen.
Gungunyana Forest, *Goldsmith* 67/61
(*N. sambesina* Gilg)
(*Lachnopylis sambesina* (Gilg) C.A.Sm.)

,, floribunda Benth.
(*Lachnopylis floribunda* (Benth.) C.A.Sm.)

,, oppositifolia (Hochst.) Benth.
(*Lachnopylis oppositifolia* Hochst.)
(*L. dentata* R.Br.)
(*Nuxia dentata* R.Br.)

Strychnos cocculoides Bak.

,, decussata (Pappe) Gilg
(*S. atherstonei* Harv.)

,, henningsii Gilg
(*S. holstii* Gilg)

,, innocua Del. subsp. burtonii (Baker) Bruce & Lewis var. burtonii
(*S. burtonii* Bak.)
(*S. quaqua* Gilg)

,, innocua Del. subsp. dysophylla (Benth.) Verdoorn
(*S. randiiformis* Baill.)
(*S. dysophylla Benth.* subsp. *dysophylla* Bruce & Lewis)

,, innocua Del. subsp. innocua

,, mitis S. Moore

,, pungens Solered.

,, spinosa Lam.
(*S. spinosa* Lam. subsp. *lokua* (A. Rich.) E. A. Bruce)
(*S. tonga* Gilg)

Strychnos stuhlmannii Gilg

,, usambarensis Gilg
(*S. micans* S. Moore)

APOCYNACEAE

Acokanthera schimperi (A.DC.) Schweinf. var. rotundata L. E. Codd

,, oblongifolia (Hochst.) L. E. Codd
(*A. veneata* Don. var. *spectabilis* (Sond.) Sim)

,, oppositifolia (Lam.) L. E. Codd

,, rhodesica Meram
Resape, *Dehn* 36/52

Carissa bispinosa (L.) Desf. var. acuminata (E. Mey.) L. E. Codd
(*C. arduina* Stapf.)

, edulis Vahl
(*C. edulis* (Forsk.) Vahl var. *tomentosa* (A. Rich.) Stapf.)
(*C. tomentosa* A. Rich.)

Diplorhynchus condylocarpon (Muell. Arg.) Pichon
(*D. condylocarpon* (Muell. Arg.) Pichon subsp. *mossambicensis* (Benth Duvign.)
(*D. condylocarpon* (Muell. Arg.) Pichon subsp. *mossambicensis* (Benth Duvign. var. *psilopus*)

Holarrhena pubescens (Buch.-Ham.) Wall.
(*H. febrifuga* Klotzsch)

Mascarenhasia variegata Britten & Rendle

Pleiocarpa pycnantha (K. Schum.) Stapf. var. pycnantha
Chirinda Forest, *Pardy & Hack* 2, *Swynnerton* 14

Rauwolfia caffra Sond.
(*R. natalensis* Sond.)
(*R. inebrians* K. Schum.)

Tabernaemontana elegans Stapf.
(*Conopharyngia elegans* (Stapf) Stapf)

,, stapfiana Britten
(*Conopharyngia stapfiana* (Britten) Stapf.)

Tabernaemontana ventricosa Hochst. ex A.DC.
(*Conopharyngia ventricosa* Stapf.)

BORAGINACEAE

Cordia abyssinica R.Br.
(*C. holstii* Gurke)

,, dioica Boj. ex DC.

,, gharaf (Forsk.) Ehrenb. ex Aschers.
(*C. rothii* Roem. & Schult.)

,, grandicalyx Oberm.

,, myxa L.

,, ovalis R. Br.

,, pilosissima Bak.
Mazoe, *Mowbray* 7: Sebungwe, *Phipps* 1,460, etc.: Lomagundi, *Goldsmith* 9/61: Urangwe, *Savory* 635: Victoria Falls, *Wild* 3,087

,, senegalensis Juss. ex Poir.

,, sp. aff. C. heudelotii Bak.
Urungwe, *Wild* 4,161, etc.: Zambesi Valley, *Lovemore* 353

Ehretia amoena Klotzsch

,, coerulea Gurke

,, cymosa Thonn. var. divaricata (Bak.) Brenan

,, fischeri Gurke

,, obtusifolia Hochst. ex DC.

,, rigida Thunb.

VERBENACEAE

Clerodendrum glabrum E. Mey. var. ovale (Klotzsch) Pearson

,, myricoides (Hochst.) R.Br. ex Vatke

,, wildii Moldenke

Holmskioldia spinescens (Klotzsch) Vatke

Holmskioldia tettensis (Klotzsch) Vatke
Sebungwe, *Lovemore* 191

Premna senensis Klotzsch

Vitex amboniensis Gurke

,, isotjensis S. Moore

,, lokundjensis Pieper
Chirinda Forest, *Chase* 435, etc.

,, madiensis Oliv. var. milangiensis (Britten) F. White

,, mombassae Vatke
(*V. flavescens* Rolfe)
(*V. goetzii* Gurke)

,, petersiana Klotzsch

,, payos (Lour.) Merr.
(*V. hildebrandtii* Vatke)
(*V. eylesii* S. Moore)
(*V. guerkeana* Engl. ex Eyles)

,, pooara Corbishley
Wankie, *Levy* 73: Umtali, *Chase* 1,965

SCROPHULARIACEAE

Halleria lucida L.

BIGNONIACEAE

Fernandoa magnifica Seem
Chipinga, *Soane* 310: Martin For. Res., *McGregor* 48/65

Kigelia pinnata (Jacq.) DC.

Markhamia acuminata (Klotzsch) K. Schum.

,, obtusifolia (Bak.) Sprague

,, puberula (Klotzsch) K. Schum.
Sebungwe, *Lovemore* 228

,, zanzibarica (Boj. ex DC.) K. Schum. ex Engl.

Stereospermum kunthianum Cham.

PEDALIACEAE

Sesamothamnus lugardii N.E.Br.

RUBIACEAE

Adina galpini Oliv.
Inyamadzi Valley, *Swynnerton* 1,135

,, microcephala (Del.) Hiern

Aidia micrantha (K. Schum) Bullock ex F. White
(*Randia micrantha* K. Schum.)
(*R. lucidula* Hiern)

Aulacocalyx diervilleoides (K. Schum.) Petit
Chirinda Forest, *Goldsmith* 192/62, *Angus* & *White* 2,999, etc.: Umtali, *Chase* 1,466

Canthium burtii Bullock

,, crassum (Schweinf.) Hiern
(*C. platyphyllum* Hiern)
(*C. randii* S. Moore)
(*Plectronia randii* (S. Moore) Torre & Harms)

,, frangula S. Moore

,, gueinzii Sond.
(*C. scabrosum* Bullock)
(*Plectronia guenzii* (Sond.) Sim)

,, huillense Hiern

,, inerme

,, lactescens Hiern
(*C. umbrosum* Hiern)

,, mundtianum Cham. & Schlecht.

,, pauciflorum Klotzsch

,, swynnertonii S. Moore
(*Plectronia swynnertonii* (S. Moore) Torre & Harms)

,, venosum (Oliv.) Hiern
(*C. sylvaticum* Hiern)

,, ventosum (L.) S. Moore
(*Plectronia ventosa* L.)

,, wildii Suess.

Coffea ligustroides S. Moore

,, swynnertonii S. Moore
(Melsetter, *McGregor* (Dept. Agric. S.F. 2,669))

Craterispermum laurinum (Poir.) Benth.

Cremospora triflora (Thonn.) K. Schum.
(*C. africana* Benth.)

Crossopteryx febrituga (Afzel. ex G. Don) Benth.
(*C. kotschyana* Fenzl.)
(*C. africana* K. Schum.)

Didymosalpinx norae (Swynnerton) Keay
Chirinda Forest, *Wild* 2,035, etc.: Chipete Forest, Hack 222/50
(*Gardenia norae* Swynn.)

Enterospermum littorale Hiern
Chipinda Pools, *Wormald* 83/51: Sabi-Lundi Jctn., *Plowes* 1,158, etc.: Danga, *Chase* 2,421

,, rhodesicum Brem.

Feretia aeruginescens Stapf.

Gardenia asperula Stapf. & Hutch.

,, imperalis K. Schum.

,, jovis-tonantis (Welw.) Hiern

,, posoquerioides S. Moore
Chirinda Forest, *Goldsmith* 38/62, *Rattray* 1,164, etc.

,, resiniflua Hiern

,, spatulifolia Stapf. & Hutch.

Heinsia crinita (Afzel.) G. Tayl.
(H. jasminiflora DC.)

Hymenodictyon floribundum (Hochst. & Steud.) B. L. Robinson
(*H. kurria* Hochst.)

Ixora rhodesiaca Brem.

Lasianthus kilimanscharicus K. Schum.
(Melsetter, *Armitage* 70/55: Nyunkombe Valley, *Gilliland* 877)

Mussaenda arcuata Lam. ex Poir.

Oxyanthus gerrardii Sond.
Chirinda Forest, *Swynnerton* 116

,, swynnertonii S. Moore
Chirinda Forest, *Wild* 2,224, etc.

Pavetta assimilis Sond. var. pubescens Brem.

,, comostyla S. Moore

,, schumanniana F. Hoffm. ex K. Schum.

,, umtalensis Brem.

,, vumbana Brem.
Vumba Mts., *Drummond* 5,089, etc.: Chirinda Forest, *Chase* 440: Inyangana, *Mullins* s.n.

Psychotria megistostira (S. Moore) Petit var. punicea (S. Moore)Petit
(*Grumilea punicea* S. Moore)

,, zombamontana (Kuntze) Petit
(*Grumilea Kirkii* Hiern)

Rothmannia fischeri (K. Schum.) Bullock ex Oberm.
(*Randia fischeri* K. Schum.)

,, manganjae (Hiern) Keay

,, urcelliformis (Schweinf. ex Hiern) Bullock ex Robyns

Rytigynia sp. (aff. R. neglecta (Hiern)) Robyns
Umtali, *Whellan* 1,597, etc.: Chirinda Forest, *Chase* 489, etc.

Tapiphyllum velutinum (Hiern) Robyns
(*Vangueria velutina* Hiern)

Tarenna affinis (K. Schum.) S. Moore
Vumba Mts., *Chase* 7,028: Chipinga, *Rattray* s.n.

,, luteola (Stapf.) Brem.
(*Pavetta luteola* Stapf.)

,, neurophylla (S. Moore) Brem.
(*Pavetta neurophylla* S. Moore)

,, nigrescens (Hook.f.) Hiern
Umtali, *Eyles* 4,460, etc.: Melsetter, *Goodier* & *Phipps* 328

,, pavettoides (Harv.) Sim
(*Pavetta friesiorum* K. Krause)
(*Tarenna friesiorum* (K. Krause) Brem.)

Tricalysia allenii (Stapf.) Brenan

,, andogensis Hiern
(*T. pachystigma* K. Schum.)

Tricalysia angolensis A. Rich.
(*T. benguellensis* Welw.)
(*T. griseiflora* K. Schum.)
(*T. niamniamensis* Schweinf. ex Hiern)

,, congesta (Oliv.) Hiern

,, coriacea Hiern
Chimanimani Mts., *Wild* 3,530 (30,365): Melsetter, *Chase* 2,984, etc.: Inyanga, *Plowes* 2,047

,, jasminiflora (Klotzsch) Benth. & Hook. f.

,, myrtifolia S. Moore
(*T. buxifolia* Krause)

Vangueria esculenta S. Moore

,, lasioclados K. Schum.
(*V. rupicola* Robyns)

,, longicalyx Robyns
(*V. apiculata* K. Schum.)
Inyanga, *Wild* 1,576

,, tomentosa Hochst.

Vangueriopsis lanciflora (Hiern) Robyns

Xeromphsis obovata (Hochst.) Keay
(*Randia kraussii* Harv.)

,, vestita (Moore) Boughey
(*Randia vestita* S. Moore)

COMPOSITAE

Brachylaena rhodesiana S. Moore

,, rotundata S. Moore

Senecio mannii Hook. f.
(*Crassocephalum mannii* (Hook. f.) Milne-Redhead)

Vernonia ampla Hoffm.

,, amygdalina Del.

,, colorata (Willd.) Drake

CYATHEACEAE

Cyathea capensis (L.f.) Sm.
(*Hemitelia capensis* (L.f.) Koulf.)

Cyathea deckenii Kuhn

,, dregei Kunze

,, zambesiaca Bak.
(*C. holstii* Hiern)

PODOCARPACEAE

Podocarpus milanjianus Rendle

CUPRESSACEAE

Widdringtonia whytei Rendle

LILIACEAE

Aloe excelsa Berger

AGAVACEAE

Dracaena steudneri Engl. var. kilimandscharica Engl.

,, usambarensis Engl.

STRELITZIACEAE

Strelitzia caudata R. A. Dyer forma glauca

,, nicolai Regel & Korn

MUSACEAE

Ensete edule (Gmel.) Horan.

PALMAE

Borassus aethiopum Mart.
(*B. flabellifer* L. var. *aethiopum* (Mart.) Warb.)

Hyphaene crinita Gaertn.

,, ventricosa Kirk
Victoria Falls, *Wild* 3,099, etc.

Phoenix reclinata Jacq.

Raphia ruffia (Jacq.) Mart.

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PTERIDOPHYTA COLLECTED ON AN EXPEDITION TO NORTHERN MOÇAMBIQUE

E. A. C. L. E. Schelpe
(*Bolus Herbarium, University of Cape Town*)

Abstract

Pteridophytes collected by the author on an expedition to Northern Mocambique are treated systematically. They include *Cheilanthes mossambicensis* sp. nov. and *Notholaena leachii* sp. nov. Six new combinations are proposed.

Introduction

The most recent taxonomic treatment of the Pteridophyta of Moçambique is that of Alston (1954) based largely on the collections of Torré and Mendonça who collected ferns in the territory during the period 1934–1944. Before them J. T. Last collected some rather fragmentary fern specimens around Namuli in 1886. In order to establish the identity of at least one of the species described from the Last collection and to extend the survey of the distribution of pteridophytes in northern Moçambique for the Flora Zambesiaca, an expedition was undertaken with Mr. L. C. Leach during the dry season in July 1962.

The expedition entered northern Moçambique through Mandimba and followed the road to Nampula, collecting intensively on Ribauè Mountain (serra de Ribauè) and in the vicinity of Ribauè and investigating large and small granite domes along the route. On the return journey the party turned south through Lioma to collect on Namuli Mountain (serra de Guruè).

Ribauè Mountain, which is in an area receiving an average annual rainfall of 1100 mm. (c. 44 in.), was climbed on the eastern side to an altitude of 4,000 ft. Brachystegia woodland of varying density was encountered together with forest along the streams. Namuli Mountain, another granite peak, is a higher and larger massif than Ribauè Mountain and receives a much higher rainfall of over 2000 mm. (80 in.) per annum. On the south-western and southern flanks there are extensive tea plantations together with the remnants of tall forest, as are found along the Rio Licungo; the steeper slopes are covered with woodland alternating with forest along the ravines. The party ascended to the main plateau at about 4,000 to 4,500 ft. elevation through the Licungo valley, and traversed round to the north of the main peak and descended on the eastern flank. Gallery forests occurred along the rivers and streams but the greater part of the plateau was under grassland which showed signs of considerable disturbance by cultivation. There was also evidence that the forests are much less extensive than in the past probably due to felling, burning and shifting cultivation.

Using Alston's (1954) enumeration as a basis and allowing for misidentifications in that paper, the expedition's pteridophyte collections have resulted in 24 new records for the vicinity of Ribauè Mountain and 33 new records for Namuli Mountain. It has also increased the total number of pteridophytes known from northern Moçambique from 55 to 80 species, including two new species described in this paper. Schelpe and Leach collections have been abbreviated to "S & L" and new records for northern Moçambique are marked with an asterisk. The first set of the pteridophyte specimens collected on this expedition are in the Bolus Herbarium, University of Cape Town.

ACKNOWLEDGMENTS

The author wishes to express his gratitude to the University of Cape Town for grants enabling him to undertake this expedition and to Mr. L. C. Leach for his organization, and help and companionship in the field. The expedition is also greatly indebted to the Administradores de Circunscrição of Ribauè and Vila Jonqueiro for arranging transport or porters and to Engr. F. Sousa de Almeida of the Brigada de Tabac, Ribauè and Engr. A. Serra and his staff of the Brigada do Châ, Guruè for their generous hospitality and help.

LYCOPODIACEAE

Lycopodium dacrydioides Bak., Fern Allies: 17 (1887). Type from South Africa.

Urostachys dacrydioides (Bak.) Hert. ex Nessel, Bärlappgew.: 188 (1939).

ZAMBÉZIA: Namuli Mtn. (N.E. sector). Locally frequent low-level epiphyte in gallery forest. 3,500 ft. 27.vii.62. *S & L* 7057.

***Lycopodium verticillatum** L.f., Suppl.: 448 (1781). Type from Réunion.

Urostachys verticillatus (L.f.) Hert. ex Nessel, Bärlappgew.: 121 (1939).

Huperzia verticillata (L.f.) Rothm. in Fedde, Rep. Sp. Nov., **54**: 60 (1944).

Lycopodium setaceum Lam., Encycl. Méth. Bot., **3**: 653 (1789). Type from Mascarene Is.

ZAMBÉZIA: Namuli Mtn. (N.E. sector). Occasional low-level epiphyte in gallery forest. 3,500 ft. 27.vii.62. *S & L* 7055.

The tropical American *L. acerosum* Sw. is most probably conspecific with *L. verticillatum* L.f.

Lycopodium cernuum L., Sp. Pl., **2**: 1103 (1753). Type from Asia.

Lepidotis cernua (L.) Beauv., Prod. Aeth.: 101 (1805).

Lycopodium fruticescens Dill., Hist. Musc. reimpr.: 456, t. 63, fig. 10 (1811). Type from Asia.

Lycopodium marianum Willd. in L., Sp. Pl., ed. iv, 5: 31 (1810). Type from Philippine Is.

Lycopodium boryanum A. Rich., Sert. Astrol.: 42 (1834). Type from Mascarene Is.

Lycopodium heeschii K. Muell. in Bot. Zeit., **19**: 164 (1861). Type from Sierra Leone.

Lycopodium hupeanum K. Muell. in Bot. Zeit., **19**: 165 (1861). Type from Borneo.

Lycopodium secundum K. Muell. in Bot. Zeit., **19**: 164 (1861). Type from South Africa.

Lycopodium sikkimense K. Muell. in Bot. Zeit., **19**: 164 (1861). Type from Sikkim Himalaya.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Châ Moçambique. Locally frequent on moist earthbank in open shade. 2,500 ft. 29.vii.62. *S & L* 7073.

SELAGINELLACEAE

***Selaginella njamnjamensis** Hieron. in Hedwigia, **39**: 312 (1900). Type from Sudan.

NIASSA: 7 mls. W. of Mandimba. Locally abundant in depressions in granite outcrop. 2,000 ft. 17.vii.62. *S & L* 6910.

MOÇAMBIQUE: 17 mls. E. of Nova Freixo. Abundant on W. aspect granite outcrop. 1,800 ft. 17.vii.62. *S & L* 6912; Ribauè Mtn. (E. sector). Locally abundant on granite outcrop in Brachystegia woodland. 3,100 ft. 19.vii.62. *S & L* 6947; 28 mls. E. of Ribauè. Locally abundant on granite outcrop. 1,700 ft. 23.vii.62. *S & L* 6978; 6 mls. E. of Nampula. Locally abundant on S.W. aspect granite outcrop. 1,400 ft. 23.vii.62. *S & L* 6983; 11 mls. E. of Namina. Locally abundant on granite hill around Vellozia. 2,000 ft. 24.vii.62. *S & L* 6985.

ZAMBÉZIA: 10 mls. S. of Lioma. Locally abundant on E. aspect granite outcrop. 25.vii.62. *S & L* 6933; Namuli Mtn. (S.W. sector). Locally abundant on granite outcrop on margin of gully forest. 3,200 ft. 25.vii.62. *S & L* 7005.

***Selaginella mittenii** Bak. in Journ. of Bot., **21**: 81 (1883). Type from Tanganyika.

Selaginella welwitschii Bak. in Journ. of Bot., **21**: 81 (1883). Type from Angola.

Selaginella mackenii Bak. in Journ. of Bot., **22**: 89 (1884). Type from Natal.

Selaginella cooperi Bak. in Journ. of Bot., **22**: 89 (1884). Type from Orange Free State.

Selaginella tectissima Bak. in Journ. of Bot., **22**: 89 (1884). Type from Transvaal.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional on streamside earthbanks about boulder bases. 2,000 ft. 19.vii.62. *S & L* 6950.

***Selaginella abyssinica** Spring in Mém. Acad. roy. Belg., **24**: 99 (1850). Type from Ethiopia.

Selaginella kirkii Bak. in Journ. of Bot., **23**: 176 (1885). Type from Usagura Mtns.

Selaginella goetzei Hieron. in Bot. Jahrb., **30**: 265 (1901). Type from Kinga Mtns.

Selaginella whytei Hieron. in Engler & Prantl., Nat. Pflanzenfam., **1** (4): 697 (1901). Type from Nyasaland.

Selaginella preussii Hieron. in Engler & Prantl., Nat. Pflanzenfam., **1** (4): 686 (1901). Type from Cameroons.

Selaginella bueensis Hieron. in Hedwigia, **43**: 20 (1904). Type from Nigeria.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional on forest floor in gully. 3,600 ft. 19.vii.62. *S & L* 6924.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally frequent on shaded earthbank in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7036.

MARATTIACEAE

Marattia fraxinea Smith ex Gmel. var. **salicifolia** (Schrad.) C.Chr. in Perrier, Catalogue Pl. Madag.: 67 (1932).

Marattia salicifolia Schrad. in Gött. gel. Anz., **1818**: 920 (1818). Type from South Africa.

Marattia natalensis Presl, Suppl.: 9 (1845). Type from Natal.

Marattia dregeana Presl, Suppl.: 9 (1845). Type from Pondoland.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally common along stream in deep shade in gully forest. Stipe prickly. 3,500 ft. 19.vii.62. *S & L* 6936.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional in deep shade in gully. 2,500 ft. 25.vii.62. *S & L* 6999.

The Moçambique and South African plants have consistently more attenuated and narrower pinnules, which are also usually more closely serrate, than in the typical variety from the Mascarene Islands.

OSMUNDACEAE

Osmunda regalis L., Sp. Pl. 2: 1065 (1753). Type from Europe.

Struthiopteris regalis (L.) Bernh. in Schrad. Journ., **1800** (2): 126 (1801).

Osmunda capensis Presl, Suppl.: 63 (1845) non L. (1771). Type from Pondoland, S. Africa.

Osmunda regalis L. var. *capensis* (Presl.) Milde, Fil. Europ.: 63 (1867).

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally common on streambank in light shade. 4,300 ft. 26.vii.62. *S & L* 7023.

GLEICHENIACEAE

Dicranopteris linearis (Burm. f.) Underw. in Bull. Torrey bot. Cl., **34**: 250 (1907).

Polypodium lineare Burm. f., Fl. Ind.: 235, t. 67, fig. 2 (1768). Type cited from Java but probably from Ceylon.

Gleichenia linearis (Burm. f.) Clarke in Trans. Linn. Soc. Lond., **1**: 428 (1880).

Mertensia linearis (Burm. f.) Fritsch in Bull. Herb. Boiss., sér. 2, **1**: 1092 (1901).

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Châ Moçambique. Occasional in gallery forest in open shade. 2,700 ft. 29.vii.62. *S & L* 7078.

HYMENOPHYLLACEAE

Trichomanes pyxidiferum L. var. **melanotrichum** (Schlechtend.) Schelpe stat. nov. et comb. nov.

Trichomanes melanotrichum Schlechtend., Adumbr.: 56 (1825). Type from Cape Province. (Basionym).

Vandenboschia melanotricha (Schlechtend.) Pic. Serm. in Webbia, **12**: 127 (1955).

Trichomanes frappieri Cordem. in Bull. Soc. Sci. Art. Réunion, **1890–91**: 37 (1891). Type from Réunion.

Trichomanes pyxidiferum L. forma. *major* Taton in Bull. Soc. roy. Bot. Belg., **78**: 34 (1946).

MOÇAMBIQUE: Ribauè Mtn. (E. sector) Rare, low-level epiphyte in deep shade in gallery forest. 3,500 ft. 19.vii.62. *S & L* 6940.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional lithophyte in deep shade in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7038; Namuli Mtn. (S.W. sector), Rio Licungo. Locally abundant on deeply shaded rocks in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7086.

The West Indian *T. pyxidiferum* has larger and more open fronds than in similarly luxuriant forms of the African plants but since no consistent differences seem to exist between the more common smaller forms in the two geographical areas, the South African segregate is treated here as a variety of the American plant.

CYATHEACEAE

Cyathea dregei Kunze in Linnaea, **10**: 551 (1836). Type from Pondoland.

Cyathea burkei Hook., Sp. Fil., **1**: 23, t. 17, fig. b (1844). Type from Transvaal.

Cyathea angolensis Welw. ex Hook., Syn. Fil.: 22 (1865). Type from Angola.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional in light shade on streambank. Trunk 3 ft. high. 3,400 ft. 19.vii.62. *S & L* 6943.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional in gully. Trunk 6 ft. high, stipe slightly tuberculate, frond 6 ft. long. 3,200 ft. 25.vii.62. *S & L* 7006.

DENNSTAEDTIACEAE

Pteridium aquilinum (L.) Kuhn in v. Deck., Reisen, **3** (3) Bot.: 11 (1879).

Pteris lanuginosa Bory ex Willd. in L., Sp. Pl., ed. iv, **5**: 403 (1810). Type from Réunion.

Allosorus lanuginosus (Bory ex Willd.) Presl, Tentamen: 154 (1836).

Pteris capensis Thunb., Prod. Pl. Cap.: 172 (1800). Type from Cape Province.

Allosorus capensis (Thunb.) Pappe & Raws., Syn. Fil. Afr. Austr.: 32 (1858) non Presl. (1836).

Pteridium capensis (Thunb.) Krasser in Ann. Hofmus. Wien, **15**: 6 (1900).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional to frequent in undergrowth of Brachystegia woodland. Fronds up to 5 ft. long. 3,800 ft. 19.vii.62. *S & L* 6928.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally abundant in undergrowth of woodland and in cleared land. 2,500 ft. 25.vii.62. *S & L* 7003.

VITTARIACEAE

Vittaria guineensis Desv. var. **orientalis** Hieron. in Bot. Jahrb., **53**: 423 (1915). Varietal type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Locally frequent low-level epiphyte in tall riverine forest. 3,000 ft. 29.vii.62. *S & L* 7079.

Vittaria volkensii Hieron. in Bot. Jahrb., **53**: 428 (1915). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (N.W. sector). Locally common low-level epiphyte in gallery forest. 4,500 ft. 26.vii.62. *S & L* 7045; Namuli Mtn. (S.W. sector), Rio Licungo. Occasional low-level epiphyte in tall riverine forest. 3,000 ft. 29.vii.62. *S & L* 7080.

ADIANTACEAE

***Pityrogramma calomelanos** (Sw.) Link, Handb. Gewächse, **3**: 20 (1833).

Acrostichum calomelanos L., Sp. Pl., **2**: 1072 (1753). Type from America.

Acrostichum ebeneum L., Sp. Pl., **2**: 1071 (1753). Type from Jamaica.

Gymnogramma bidentata Presl, Rel. Haenk., **1**: 18, t.2, fig. 3 (1825).

Gymnogramma distans Link, Hort. Berol., **2**: 53 (1833). Type from ?Brazil.

Pityrogramma chamaesorbus Domin in Publ. Fac. Sci. Univ. Charl., **88**: 6 (1928). Type from British Guiana.

Pityrogramma insularis Domin in Publ. Fac. Sci. Univ. Charl., **88**: 6 (1928). Syntype from Principé and Fernando Po.

ZAMBÉZIA: Namuli Mtn. (E. sector). Rare, on streambank between tea plantations. 2,300 ft. 27.vii.62. *S & L* 7071; Namuli Mtn. (S.W. sector), Châ Moçambique. Locally frequent on earthbank in open shade. 2,500 ft. 29.vii.62 *S & L* 7074.

The typical variety of this tropical American species has apparently been introduced to many parts of the tropics of the Old World. This variety has been noted as a weed in West Africa by Alston (1959) and by Wardlaw (1962). The earliest specimens recorded from Africa are from Fernando Po and Principé in 1858.

Adiantum philippense L., Sp. Pl., **2**: 1094 (1753). Type from Philippine Is.

Adiantum lunulatum Burm. f., Fl. Ind.,: 235 (1768). Type from ? India.

Pteris lunata Retz., Observ. Bot., **2**: 28, t.4 (1781).

Adiantum lunatum Cav., Descr. Pl., **1**: 272 (1802). Type from Mariana or Philippine Is.

Adiantum arcuatum Sw., Syn. Fil.: 122 (1806). Type from Mariana or Philippine Is.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally common on shaded earthbank. 2,000 ft. 19.vii.62. *S & L* 6953.

Pteris catoptera Kunze in Linnaea, **18**: 119 (1844). Type from Natal.

Pteris abrahamii Hieron. in Bot. Jahrb., **53**: 409 (1915). Type from Natal.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional on floor of gully forest in shade. 3,500 ft. 19.vii.62. *S & L* 6938.

A forest species with thin textured fronds which is frequent in the eastern parts of Southern Africa and which has been confused in the past with *P. biaurita* L. and *P. quadriaurita* Retz.

Pteris friesii Hieron., Wiss. Ergebn. Schwed. Rhodesia—Kongo Exped. 1911–12. Bot., **1**: 5 (1914). Type from Northern Rhodesia.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Châ Moçambique. Occasional on shaded moist earthbanks and as a weed in tea plantations. 2,500 ft. 29.vii.62. *S & L* 7075.

A species with consistently firmer fronds than in *P. catoptera* and with a wide distribution in East Tropical Africa.

Cheilanthes mossambicensis Schelpe sp. nov.

Ex affinitate *C. welwitschii* Hook. differt farina aurantiaco, frondibus 4—6 jugatis, rhizoma gracile.

Rhizoma repens gracile, 2 mm. diam., paleis subulatis 1·5 mm. longis atrofuscis vestitis, frondibus c. 5 mm. separatim instructis. Stipes teres castaneus usque ad 22 cm. longus, paleis anguste lanceolatis fuscis caducis et farina aurea donec immaturus. Lamina bipinnatifida oblonga, supra atroviridem, subtus aurantiaco-farinosa usque as 17 cm. longa et 7 cm. lata, 4—6 juga. Rachis sulcata, farinosa donec immatura. Pinnae petiolatae vel subsessiles ovato-lanceolatae,

pinnatifidis, lobis oblongis crenatis usque ad 5 mm. latis, lobis basiscopicis longioris quam lobis acroscopicis. Costae et costulae subtus castaneae. Sori marginales, sporangiis in linea tenue dispositis; indusia angustissima irregulariter lacerata. Sporae subglobosae, flavidae, 42—48μ diam., minute verrucosae.

Rhizome creeping, slender, 2 mm. diam. clothed with dark brown subulate scales 1·5 mm. long, bearing fronds at intervals of c. 5 mm. Stipe castaneous terete, up to 22 cm. long with caducous narrowly lanceolate brown scales and yellow farina when immature. Lamina bipinnatifid oblong or narrowly oblong, dark green above, orange farinose (Cadmium orange; HCC 8) below, up to 17 cm. long and 7 cm. broad with 4—6 (usually 5) pairs of pinnae. Rachis sulcate, farinose when young. Pinnae petiolate or subsessile, ovate-lanceolate pinnatifid with narrowly oblong crenate lobes up to 5 mm. broad, the basiscopic lobes longer than the acroscopic lobes. Costae and costules castaneous below. Sori marginal; indusia very narrow (less than 1 mm. broad) irregularly lacerate. Spores subglobose yellow 42—48μ diam., minutely verrucose.

HOLOTYPE: Moçambique, Moçambique district, Ribauè, 1½ mls. S.W. of Poste Agricola; locally abundant in overhung horizontal N.W. aspect crevice on granite hill. 1,800 ft. alt. 20.vii.1962. *Leach & Schelpe* 11421 (BOL). ISOTYPES (K, SRGH, etc.).

PARATYPE: Tanganyika, Songea district, Chandamara Hill, about 6 km. N. of Songea in crevices in rock outcrops near top of hill. 1,200 m. 23.iii.1956. *Milne-Redhead & P. Taylor* 9292 (BOL ex K).

C. mossambicensis is most closely similar to the Angolan *C. welwitschii* but differs from the latter in having orange not ochre yellow farina, in having the fronds more widely spaced on the rhizome and in having fronds which are broader and consist of fewer pinnae. The much larger *C. farinosa* (Forsk.) Kaulf. which is widespread in tropical Africa has a much paler yellowish farina and appears to be confined to much moister habitats.

Cheilanthes multifida (Sw.) Sw., Syn. Fil.: 129, 334 (1806).

Adiantum multifidum Sw. in Schrad. Journ., **1800** (2): 85 (1801). Type from Cape Province.

Adiantum globatum Poir., Encycl. Méth. Bot., Suppl. 1: 144 (1810). Type from Cape Province.

Cheilanthes refracta Pappe & Raws., Syn. Fil. Afr. austr.: 34 (1858). Type from Cape Province.

Cheilanthes madagascariensis Bak. in Journ. Linn. Soc., Lond., **16**: 198 (1877). Type from Madagascar.

Adiantopsis madagascariensis (Bak.) C. Chr., Ind. Fil.: 22 (1905).

Cheilanthes bolusii Bak. in Hook., Ic. Pl.: t.1636 (1886). Type from Cape Province.

Cheilanthes horizontalipinnata Bonap., Not. Pterid., **16**: 87 (1925). Type from Madagascar.

ZAMBÉZIA: Namuli Mtn. (W. sector). Locally frequent in rock crevices. 5,000 ft. 26.vii.62. *S & L* 7017.

Notholaena leachii Schelpe sp. nov.

Ex affinitate *N. buchananii* Bak. sed frondibus sterilibus arcuatis proliferis.

Rhizoma breviter repens, c. 4 mm. diam., paleis anguste lanceolatis brunneis saepe linea atra centrale. Frondes confertae, fertiles suberectae, steriles arcuatae infra apicem proliferae. Stipes teres atrocastaneus plus minusve pilosus, usque ad 19 cm. longus. Lamina bipinnata vel bipinnatifida, anguste ovata vel lanceolata usque ad 9 cm. longa et 5·5 cm. lata, subtus et supra pilosa. Rachis teres atrocastanea pilosa. Pinnae ovatae vel inaequaliter deltoideae, inferiores petiolatae, superiores subsessiles, lobis integris crenatis vel pinnatifidis, 1—10 mm. latis, lobis basiscopicis longioris quam acroscopicis. Costae, et costulae pinnarum inferiorium, subtus atrocastaneae pilosae; venulae immersae. Sori marginales sporangiis numerosis; indusia angustissima. Sporae subglobosae, pallide brunneae, 41—48μ. diam., minute verrucosae.

Rhizome shortly creeping, c. 4 mm. diam., clothed with narrowly lanceolate brown scales often with a dark central stripe. Fronds clustered on the rhizome; fertile fronds suberect, sterile fronds arching over to ground level, proliferous below the apex, occasionally proliferous on costae of basal pinnae in luxuriant specimens. Stipe terete dark castaneous, more or less pilose or later glabrous, up to 19 cm. long. Lamina narrowly ovate or lanceolate, bipinnate or bipinnatifid, up to 9 cm. long and 5·5 cm. broad, pilose above and below. Rachis terete dark castaneous pilose. Pinnae ovate or unequally deltoid, the lower petiolate, the upper subsessile, with entire, crenate or pinnatifid lobes, 1—10 mm. broad, the basiscopic lobes longer than the acroscopic lobes. Costae, and the costules of the lower pinnae, dark castaneous pilose below; veins immersed. Sori marginal with numerous sporangia; indusia very narrow (less than 0·5 mm. broad). Spores subglobose, pale brown, 41—48μ. diam., minutely verrucose.

HOLOTYPE: Moçambique, Moçambique district, Ribauè, 1½ mls. S.W. of Poste Agricola; locally common around boulder bases on S. aspect of granite hill. 1,800 ft. alt. 21.vii.1962. *Schelpe & Leach* 6973 (BOL) ISOTYPES: (K, SRGH, etc.).

PARATYPES: Moçambique, Zambezia district, Namuli Mtn. (W. sector); rare, under boulder on S. aspect. 5,000 ft. 26.vii.62. (luxuriant form) *S & L* 7018 (BOL); Moçambique district, 6 mls. E. of Nampula, occasional around boulder bases or overhanging Vellozia mats on S. aspect of granite outcrop. 1,400 ft. 23.vii.62. *S & L* 6984; Moçambique district, 11 mls. E. of Namina, occasional in S. aspect granite crevices in shade of Vellozia. 2,000 ft. 24.vii.62. *S & L* 6987.

N. leachii superficially resembles the Southern African *N. buchananii* but can be distinguished in herbarium specimens by the proliferous sterile fronds. In the field it is even more distinct with the sterile fronds arching over and producing young plants near their apices usually resulting in the formation of a mat of plants. It is virtually certain that the specimen from Nampula (*Torre* 767) referred by Alston (1954) to *N. buchananii* belongs to this new species, which appears to be confined to northern Moçambique.

N. leachii is extremely variable in the size of its fronds and the shape and size of the pinna lobes. The specimens collected on Namuli Mountain in an 80 inch rainfall area are more than twice the size of those collected near Ribauè with a rainfall of about 44 inches per annum.

Doryopteris concolor (Langsd. & Fisch.) Kuhn var. **kirkii** (Hook.) Fries, Wiss. Ergebn. Schwed. Rhodesia-Kongo Exped., 1911–1912, Bot., **1**: 4 (1914).

Cheilanthes kirkii Hook., Second Cent.: t.81 (1861). Type from Moçambique.

Doryopteris kirkii (Hook.) Alston in Bol. Soc. Brot., **30**: 14 (1956).

Adiantum palmatum Schumach. in Kongl. Dansk Vid. Selsk., Nat. & Math. Afh., **4**: 234 (1829). Type from West Africa.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional on shaded earthbank. 2,000 ft. 19.vii.62. *S & L* 6954.

Most of the African specimens exhibit more cheilanthoid sori than those from Asia, America or Australasia and on this character are referred to the var. *kirkii.*

Pellaea viridis (Forsk.) Prantl in Bot. Jahrb., **3**: 420 (1882).

Pteris viridis Forsk., Fl. Aegypt. Arab.: 186 (1775). Type from Yemen.

Adiantum viride (Forsk.) Vahl, Symb. Bot., **3**: 104 (1794).

Cheilanthes viridis (Forsk.) Sw., Syn. Fil.: 127 (1806).

Pteridella viridis (Forsk.) Mett. ex Kuhn, v. Decken Reisen, **3** (3), Bot.: 16 (1879).

Allosorus viridis (Forsk.) O. Kuntze, Rev. Gen. Pl., **2**: 806 (1891).

Pteris polymorpha Poir., Encycl. Méth. Bot., **5**: 719 (1804). Type from Mascarene Is.

Pteris adiantoides Bory ex Willd. in L., Sp. Pl., ed. iv, **5**: 391 (1810). Type from Réunion.

Allosorus adiantoides (Bory ex Willd.) Presl, Tentamen: 153 (1836).

Pellaea adiantoides (Bory ex Willd.) J Sm., Cat. Kew Ferns: 4 (1856)

Platyloma adiantoides (Bory ex Willd.) Lowe, Ferns, **3**: t.33 (1857).

Pteris hastaefolia Schrad. in Gött. gel. Anz., **1818**: 917 (1818). Type from Cape Province.

MOÇAMBIQUE: Ribauè, 1½ mls. S.W. of Poste Agricola. Occasional in semi-shade on granite outcrop. 1,800 ft. 21.vii.62. *S & L* 6971.

ZAMBÉZIA: 10 mls. S. of Lioma. Occasional on E. aspect granite outcrop. 25.vii.62. *S & L* 6994.

Both specimens approach *P. viridis* var. *glauca* Sim in the degree of dissection of the fronds.

Pellaea dura (Willd.) Bak. in Journ, of Bot., **1880**: 327 (1880).

Pteris dura Willd. in L., Sp. Pl., ed. iv, **5**: 376 (1810). Type from Mauritius.

Allosorus durus (Willd.) Presl, Tentamen: 153 (1836).

Litobrochia dura (Willd.) Moore, Index: 44 (1857).

Pteridella dura (Willd.) Kuhn, v. Decken Reisen, **3** (3), Bot.: 14 (1879).

Pteris burkeana Hook., Sp. Fil., **2**: 213, t.126, fig. B (1858). Type from Transvaal.

Pellaea burkeana (Hook.) Bak., Syn. Fil.: 153 (1867).

Pellaeopsis burkeana (Hook.) J. Sm., Hist. Fil.: 290 (1875).

ZAMBÉZIA: Namuli Mtn. (E. sector). Occasional weed in tea plantation. 2,300 ft. 27.vii.62. *S & L* 7072.

Pellaea doniana J. Sm. ex Hook., Sp. Fil., **2**: 137, t.125, fig. A (1858). Type from São Tomé.

Pteris doniana (J. Sm. ex Hook.) Kuhn, Fil. Afr.: 80 (1868).

Pteridella doniana (J. Sm. ex Hook.) Kuhn, v. Decken Reisen, **3** (3), Bot.: 13 (1879).

Allosorus donianus (J. Sm. ex Hook.) O. Kuntze, Rev. Gen. Pl., **2**: 806 (1891).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally common on streamside in open shade. 2,000 ft. 19.vii.62. *S & L* 6951.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional on streambank in semi-shade. 2,500 ft. 25.vii.62. *S & L* 7004.

Pellaea calomelanos (Sw.) Link var. **swynnertoniana** (Sim) Schelpe stat. nov. et comb. nov.

Pellaea swynnertoniana Sim, Ferns S. Afr., ed. ii: 213, t.101 (1915). Type from Southern Rhodesia. (Basionym)

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional about large granite outcrop in Brachystegia woodland. 3,100 ft. 19.vii.62. *S & L* 6945.

In this population the segments of the lamina are mostly triangular deltoid as in typical var. *swynnertoniana* but are smaller in size. As there is an almost continuous intergradation in pinnule shape between typical *P. calomelanos* and typical *P. swynnertoniana*, all the forms with large or small deltoid triangular segments can be referred to the var. *swynnertoniana*.

Actiniopteris dimorpha Pic. Serm. in Webbia, **17**: 18, t.2 (1962). Type from Tanganyika.

NIASSA: 7 mls. W. of Mandimba. Locally frequent around boulder bases on granite outcrop in Brachystegia woodland. 2,000 ft. 17.vii.62. *S & L* 6909.

MOÇAMBIQUE: 17 mls. E. of Nova Freixo. Occasional around boulder bases on granite outcrop. 1,800 ft. 17.vii.62. *S & L* 6911; 28 mls. E. of Malima. Occasional among rubble under shrubs on W. aspect granite outcrop. c. 2,000 ft. 18.vii.62. *S & L* 6913; Ribauè Mtn. (E. sector). Locally frequent about bare granite outcrop in Brachystegia woodland. 3,100 ft. 19.vii.62. *S & L* 6946; Ribauè Mtn. (E. sector). Locally frequent on streamside in open shade. 2,000 ft. 19.vii.62. *S & L* 6952; Ribauè, 1½ mls. S.W. of Poste Agricola. Common among grass tussocks and on ledges on granite outcrop. 1,800 ft. 21.vii.62. *S & L* 6972; 28 mls. E. of Ribauè. Occasional in Vellozia clumps on granite outcrop. 1,700 ft. 23.vii.62. *S & L* 6979; 11 mls. E. of Namina. Occasional on granite hill about Vellozia stems. 2,000 ft. 24.vii.62. *S & L* 6986.

ZAMBÉZIA: 10 mls. S. of Lioma. Occasional on E. aspect granite outcrop. 25.vii.62. *S & L* 6995.

All the material of this genus collected in Northern Moçambique shows strong dimorphism between the sterile and fertile fronds. This taxon has previously been referred to the Mascarene *A. australis* (L.f.) Link (Alston, 1954).

POLYPODIACEAE

Pyrrosia schimperiana (Mett. ex Kuhn) Alston in Journ. of Bot., **72**, Suppl. 2: 8 (1934).

Polypodium schimperianum Mett. ex Kuhn, Fil. Afr.: 152 (1868). Type from Ethiopia.

Cyclophorus schimperianus (Mett. ex Kuhn) C. Chr., Ind. Fil.: 200 (1905).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional mid-level epiphyte in Brachystegia woodland. 3,500 ft. 19.vii.62. *S & L* 6919.

Pyrrosia rhodesiana (C. Chr.) Schelpe in Journ. S. Afr. Bot., **18**: 126 (1952).

Cyclophorus rhodesianus C. Chr. in Dansk Bot. Arkiv, **7**: 161 (1932). Type from Southern Rhodesia.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally frequent low-level epiphyte in gully forest. 3,500 ft. 19.vii.62. *S & L* 6922.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally common low-level epiphyte in gully forest. 3,200 ft. 25.vii.62. *S & L* 7007.

***Belvisia spicata** (L.f.) Mirbel, Hist. nat. de Pl., **4**: 65 (1803).

Acrostichum spicatum L.f. Suppl.: 444 (1781). Type from Mauritius.

Hymenolepis spicata (L.f.) Presl, Epim. Bot.: 159 (1849).

Hymenolepis spicata (L.f.) Presl var. *occultivenia* C. Chr. in Dansk bot. Arkiv, **6**: 57 (1929). Varietal syntype from Madagascar, Seychelles and São Tomé.

Hymenolepis spicata (L.f.) Presl var. *usambarensis* C. Chr. in Dansk bot. Arkiv, **6**: 57 (1929). Varietal type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (N.E. sector). Rare, low-level epiphyte in gully forest. 3,200 ft. 25.vii.62. *S & L* 7054; Namuli Mtn. (S.W. sector), Rio Licungo. Rare, low-level epiphyte in riverine forest in deep shade. 3,200 ft. 29.vii.62. *S & L* 7082.

Loxogramme lanceolata (Sw.) Presl, Tentamen: 215, t.9, fig. 8 (1836).

Grammitis lanceolata Sw. in Schrad. Journ., **1800** (2): 18, t.1, fig. 4 (1801). Type from Mascarene Is.

Antrophyum lanceolatum (Sw.) Blume, Fl. Jav. Fil.: 84, t.36 (1828).

Selliguea lanceolata (Sw.) Fée, Gen. Fil.: 177 (1852).

Gymnogramma lanceolata (Sw.) Hook., Sp. Fil., **5**: 156 (1864).

Grammitis coriacea Kaulf. ex Spreng., in L., Syst. Veg., ed. xvi, **4**: 41 (1827). Type from Mascarene Is.

Loxogramme coriacea (Kaulf. ex Spreng.) Presl, Tentamen: 215 (1836).

Selliguea coriacea (Kaulf. ex Spreng.) Fée, Gen. Fil.: 177 (1852).

Polypodium coriaceum (Kaulf. ex Spreng.) Mett., Polypod.: 112, t.3, fig. 25 (1857).

Polypodium loxogramme Mett., Polypod.: 112, t.2, fig. 25 (1857). Type from Mascarene Is.

Gymnogramma abyssinica Bak., Syn. Fil.: 517 (1874). Type from Ethiopia.

Loxogramme suberosa Christ in Ann. Mus. Congo, sér. 5, **3**: 37 (1909). Type from Congo.

Polypodium suberosum (Christ) C. Chr., Ind. Fil., Suppl.: 62 (1913).

Loxogramme africana Copel. in Philipp. Journ. Sci., **11**: 45, t.1, fig. 4 (1916). Type from Angola.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally frequent low-level epiphyte in deep shade in gully forest. 3,600 ft. 19.vii.62. *S & L* 6918.

Polypodium polypodioides (L.) Hitch. subsp. **ecklonii** (Kunze) Schelpe stat. nov. et comb. nov.

Polypodium ecklonii Kunze in Linnaea, **10**: 498 (1836). Type from Cape Province. (Basionym).

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional low-level epiphyte in gully forest. 3,200 ft. 25.vii.62. *S & L* 6996; Namuli Mtn. (S.W. sector), Rio Licungo. Locally common low-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7085.

The African subspecies is distinguished by the presence of hydathodes at the ends of the veins and by the usual presence of a central sclerotic band in the entire rhizome scales.

Pleopeltis lanceolata (L.) Kaulf., Enum. Fil.: 245 (1824).

Polypodium lanceolatum L., Sp. Pl., **2**: 1082 (1753). Type from South (? Central) America.

Polypodium adspersum Schrad. in Gött. gel. Anz., **1818**: 915 (1818). Type from Cape Province.

Polypodium lepidotum Willd. ex Schlechtend., Adumbr.: 17, t.8 (1825).

Pleopeltis lepidota (Willd.) Presl, Tentamen: 193 (1836).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally frequent low- to mid-level epiphyte in gully forest. 3,500 ft. 19.vii.62. *S & L* 6923.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Frequent mid-level epiphyte in riverine forest. 3,200 ft. 29.vii.62. *S & L* 7088.

Pleopeltis schraderi (Mett.) Tardieu, Fl. Madag., Polypod., **2**: 110 (1960).

Polypodium schraderi Mett., Polypodium: 98, n. 179, t.2, fig. 11 (1857). Type from Cape Province.

Niphobolus schraderi (Mett.) Keys., Pol. Cyath. Hb. Bung.: 39 (1873).

Polypodium lineare Thunb. var. *schraderi* (Mett.) Sim, Ferns S. Africa, ed. ii: 276 (1915).

Polypodium elongatum Schrad. in Gött. gel. Anz., **1818**: 915 (1818) non Aiton (1789). Type from Cape Province.

Phymatodes elongata (Schrad.) Pappe & Raws., Syn. Fil. Afr. Austr.: 41 (1858).

Polypodium gueintzii Mett., Polypodium: 91, n. 161, t.3, figs 18—19 (1857). Type from Natal.

ZAMBÉZIA: Namuli Mtn. (E. sector). Occasional epiphyte in woodland. 3,800 ft. 27.vii.62. *S & L* 7068; Namuli Mtn. (S.W. sector), Rio Licungo. Occasional low-level epiphyte in deep shade in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7083.

Pleopeltis excavata (Bory ex Willd.) Moore, Index: 347 (1862).

Polypodium excavatum Bory ex Willd. in L., Sp. Pl., ed. iv, **5**: 158 (1810). Type from Mascarene Is.

Phymatodes excavata (Bory ex Willd.) Presl, Tentamen: 196 (1836).

Drynaria excavata (Bory ex Willd.) Fée, Gen. Fil.: 270 (1852).

Polypodium simplex Sw. in Schrad. Journ., **1800** (2): 19 (1801) non Burm. (1768). Type from Mascarene Is.

Phymatodes simplex (Sw.) Presl, Tentamen: 196 (1836).

Pleopeltis simplex (Sw.) Beddome, Handb. Ferns Brit. India: 347 (1883).

ZAMBÉZIA: Namuli Mtn. (E. sector). Occasional deciduous epiphyte in forest. 3,800 ft. 27.vii.62. *S & L* 7067; Namuli Mtn. (S.W. sector), Rio Licungo. Frequent mid-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7093.

DAVALLIACEAE

Nephrolepis undulata (Afz. ex Sw.) J.Sm. in Curtis Bot. Mag., **72**, Comp.: 35 *bis* (1846).

Aspidium undulatum Afz. ex Sw. in Schrad. Journ., **1800** (2): 32 (1801). Type from Sierra Leone.

Aspidium imbricatum Kaulf. ex Spreng. in L., Syst. Veg., ed. xvi, **4**: 97 (1827). Type from Mauritius.

Nephrolepis imbricata (Kaulf. ex Spreng.) Presl, Tentamen: 79 (1836).

Nephrolepis pluma Moore in Gard. Chron., n.s., **9**: 588, fig. 68 (1878). Type from Madagascar.

Nephrolepis filipes Christ in Ann. Mus. Congo, V, **1** (3): 213 (1906). Type from Congo.

Nephrolepis cordifolia (L.) Presl var. *compacta* Bonap., Not. Pterid., **14**: 265 (1923).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Frequent in undergrowth of Brachystegia woodland. 3,800 ft. 9.vii.62. *S & L* 6927.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Frequent in undergrowth on margin of gully forest. 2,500 ft. 25.vii.62. *S & L* 7001.

Tubers were produced in both populations. The variation range in the African plants referred to *N. umdulata* overlaps that of American plants referred to *N. cordifolia* (L.) Presl and these two taxa will probably have to be considered as conspecific. However, there is some doubt about the correct application of the name *N. cordifolia* among the American species.

Arthropteris orientalis (Gmel.) Posth. in Rec. Trav. bot. Néerl., **21**: 218 (1924).

Polypodium orientale Gmel. in L., Syst. Nat., ed. xiii, **2**: 1312 (1791). Type from Yemen.

Dryopteris orientalis (Gmel.) C. Chr., Ind. Fil.: 281 (1905).

Polypodium pectinatum Forsk., Fl. Aegypt. Arab.: 185 (1775) non L. (1753). Type from Yemen.

Aspidium albopunctatum Bory ex Willd. in L., Sp. Pl., ed. iv, **5**: 242 (1810). Type from Mauritius.

Nephrodium albopunctatum (Bory ex Willd.) Desv. in Mém. Soc. Linn. Par., **6**: 255 (1827).

Aspidium thonningii Schumach. in Kongl. Dansk Vid. Selsk., Nat. & Math. Afh., **4**: 229 (1829). Type from West Africa.

Aspidium leucosticton Kunze in Linnaea, **23**: 227, 301 (1850). Type from Sierra Leone.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Locally frequent on humus covered boulder in shade in gully forest. 3,400 ft. 19.vii.62. *S & L* 6942. (Articulation halfway up stipe).

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally frequent on humus covered rock in gully forest. 3,200 ft. 25.vii.62. *S & L* 6997.

Arthropteris monocarpa (Cordem.) C. Chr. in Perrier, Cat. Pl. Madag., Pterid.: 32 (1931).

Nephrodium monocarpum Cordem. in Bull. Soc. Sci. Art. Réunion 1890–1891: 74 (1891). Type from Réunion.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Frequent on mossy boulders and as low-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7091.

Oleandra distenta Kunze in Bot. Zeit., **1851**: 347 (1851). Type from Transvaal.

Oleandra densifrons Kunze in Bot. Zeit., **1851**: 347 (1851). Type from Natal.

Aspidium articulatum Willd. in L., Sp. Pl., ed. iv, **5**: 212 (1810) non Sw. (1801). Type from Mauritius.

Oleandra articulata (Sw.) Presl var. *welwitschii* Bak., Syn. Fil., ed. i: 303 (1867). Varietal type from Angola.

Oleandra africana Bonap., Not. Pterid., **14**: 257 (1923). Type from Mauritius.

ZAMBÉZIA: Namuli Mtn. (N.W. sector). Locally common low-level epiphyte in gallery forest overhanging river. 4,500 ft. 26.vii.62. *S & L* 7044.

ASPLENIACEAE

Asplenium anisophyllum Kunze in Linnaea, **10**: 511 (1836). Type from Pondoland, South Africa.

Asplenium geppii Carr., Cat. Welw. Pl., **2**: 269 (1901). Type from Angola.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional on floor of gallery forest. 4,300 ft. 26.vii.62. *S & L* 7031.

Asplenium auritum Sw. in Schrad. Journ., **1800** (2): 52 (1801). Type from Jamaica.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Locally frequent low-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7084.

Asplenium formosum Willd. in L., Sp. Pl., ed. iv, **5**: 329 (1810). Type from Venezuela.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional low-level epiphyte on streambank in gully forest. 3,400 ft. 19.vii.62. *S & L* 6941.

Asplenium megalura Hieron. ex Brause in Wiss. Ergebn. Deutsch. Zentral-Afr. Exped., 1907–1908, **2**: 17 (1910). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (N.W. sector). Rare, low-level epiphyte in gallery forest overhanging river. 4,500 ft. 26.vii.62. *S & L* 7043.

Asplenium ramlowii Hieron. in Bot. Jahrb., **46**: 372 (1911). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally frequent in horizontal crevice in granite boulder in tea plantation. 4,000 ft. 26.vii.62. *S & L* 7021.

Asplenium aethiopicum (Burm.) Becherer in Candollea, **6**: 22 (1935).

Trichomanes aethiopicum Burm., Fl. Cap. Prod., in Fl. Ind.: 28 (1768). Type from Cape Province.

Asplenium adiantoides Lam., Encycl. Méth. Bot., **2**: (1786). Type from Cape Province.

Asplenium furcatum Thunb., Prod. Pl. Cap.: 172 (1800). Type from Cape Province.

Tarachia furcata (Thunb.) Presl, Epim. Bot.: 80 (1849).

Asplenium falsum Retz., Observ. Bot., **6**: 38 (1791). Type from Cape Province.

Asplenium gueinzianum Mett. ex Kuhn, Fil. Afr.: 103 (1868). Type from Natal (abnormal frond).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Rare low-level epiphyte in shade in gully forest. 3,500 ft. 19.vii.62. *S & L* 6920.

An aggregate species which is in considerable need of cytotaxonomic study.

***Asplenium blastophorum** Hieron. ex Brause in Bot. Jahrb., **46**: 378 (1911). Syntype from West Africa and Sudan.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Rare, on humus covered boulder in deep shade in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7090.

The larger specimens are proliferating on the costae of the pinnae as well as on the apical part of the rachis.

***Asplenium lividum** Mett. ex Kuhn in Linnaea, **36**: 100 (1869). Type from Venezuela.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional on humus-covered boulder in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7030.

Asplenium sandersonii Hook., Sp. Fil., **3**: 147, t.179 (1860). Type from Natal.

Asplenium vagans Bak., Syn. Fil.: 195 (1867). Syntype from São Tomé and Madagascar.

Asplenium debile Mett. ex Kuhn, Fil. Afr.: 101 (1868) non Fée (1865). Type from Comoro Is.

Asplenium melleri Mett. ex Kuhn, Fil. Afr.: 106 (1868) Type from Madagascar.

Asplenium punctatum Mett. ex Kuhn, Fil. Afr.: 114 (1868). Type from São Tomé.

Asplenium hanningtonii Bak. in Journ. of Bot., **1883**: 245 (1883). Type from Tanganyika.

Asplenium comorense C. Chr., Ind. Fil.: 103 (1906). Type from Comoro Is.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Rio Licungo. Locally frequent low-level epiphyte in deep shade in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7089.

Asplenium dregeanum Kunze in Linnaea, **10**; 517 (1836). Type from Pondoland, Cape Province.

Asplenium brachypteron Kunze ex. Houlst. & Moore in Gard. Mag. Bot., **3**: 260 (1851). Type from Sierra Leone.

Asplenium gracile Peter in Fedde, Rep. Sp. Nov., Beih., **40**: 73. t.5, fig. 2 (1929) non Don (1825) nec Fée (1852) nec Pappe & Rawson (1858). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally frequent on humus covered boulders in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7034.

Asplenium rutaefolium (Berg.) Kunze var. **bipinnatum** (Forsk.) Schelpe stat. nov. et comb. nov.

Lonchitis bipinnata Forsk., Fl. Aegypt. Arab.: 184 (1775). Type from Yemen. (Basionym).

Asplenium bipinnatum (Forsk.) C. Chr. in Hieron., Wiss. Ergebn. Deutsch. Zentral-Afr. Exped., **2**: 11 (1910) non Roxb. (1844).

Caenopteris furcata Berg. in Acta Petropol., **1782** (2): 249, t.7, fig. 1 (1786). Type from Réunion.

Darea furcata (Berg.) Willd. in L., Sp. Pl., ed. iv, **5**: 297 (1810).

Adiantum borbonicum Jacq., Coll., 3: 286, t.21, fig. 1 (1789). Type from Réunion.

Asplenium borbonicum (Jacq.) Hook., Sp. Fil., **3**: 207 (1860).

Darea disticha Kaulf., Enum. Fil.: 180 (1824) nom. illegit.

Caenopteris disticha (Kaulf.) Spreng. in L., Syst. Veg., ed xvi, **4**: 91 (1827).

Asplenium distichum (Kaulf.) Mett. ex Salomon, Nomenclator: 84 (1883).

Darea stans Bory in Belanger, Voy., Bot., **2**: 53 (1833). Type from Mascarene Is.

Asplenium stans (Bory) Kunze in Linnaea, **10**: 521 (1836).

Asplenium linearilobum Peter in Fedde, Rep. Sp. Nov., Beih., **40**: 80, t.2, figs. 7–8 (1929). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional lithophyte in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7033.

The typical variety from South Africa has more dissected pinnae than in the plants from the Mascarene Is., Tropical East Africa and the Yemen which are referred here to a separate variety. Intermediates between the two varieties are known from Rhodesia and Nyasaland.

Asplenium theciferum (H.B.K.) Mett. var. **concinnum** (Schrad.) C. Chr. in Dansk bot. Arkiv, **7**: 104 (1932).

Davallia concinna Schrad. in Gött. gel. Anz., **1818**: 918 (1818). Type from South Africa.

Loxoscaphe concinnum (Schrad.) Moore in Journ. of Bot., **5**: 227 (1853).

Asplenium concinnum (Schrad.) Kuhn, Fil. Afr.: 99 (1868).

Davallia campyloptera Kunze in Linnaea, **10**: 544 (1836). Type from Cape Province.

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional mid-level epiphyte in gully forest. 3,500 ft. 19.vii.62. *S & L* 6921.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional mid-level epiphyte in gully forest. 3,200 ft. 25.vii.62. *S & L* 6998; Namuli Mtn. (S.W. sector), Rio Licungo. Frequent low-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7087.

The typical variety of *A. theciferum* from tropical South America has a "horn" of tissue, subtending the sorus, which is usually much longer than in the Southern African specimens. Plants with long "horns" from Cameroons and Fernando Po were described as *A. cornutum* Alston but these intergrade through tropical Africa both with *A. theciferum* var *concinnum* and with *A. theciferum* var. *schimperi* (Hook.) Kuhn from Ethiopia and the Sudan.

THELYPTERIDACEAE

Thelypteris palustris Schott. var. **squamigera** (Schlechtend.) Tard. in Mém. I.F.A.N., **28**: 119, t.20, figs 7—9 (1953).

Aspidium thelypteris (L.) Sw. var. *squamigerum* Schlechtend., Adumbr.: 23, t.11 (1825). Type from South Africa.

Dryopteris thelypteris (L.) A. Gray var. *squamigera* (Schlechtend.) C.Chr., Ind. Fil.: 297 (1905).

Aspidium squamigerum (Schlechtend.) Fée, Mém. Fam. Foug., **8**: 104 (1857).

Pteris confluens Thunb., Prod. Fl. Cap.: 171 (1800). Type from Cape Province.

Lastrea squamulosa Presl, Tentamen: 76 (1836) nom. nud.

Nephrodium squamulosum (Presl) Hook. f., Fl. N.Z., **2**: 39 (1855).

Lastrea thelypteris (L.) Bory var. *squamulosa* Beddome, Handb. Ferns Brit. India, Suppl.: 54 (1892).

Thelypteris squamulosa (Presl) Ching in Bull. Fan. Mem. Inst. Biol. Bot., 6: 5, 329 (1936).

ZAMBÉZIA: Namuli Mtn. (W. sector). Locally frequent in moist gully in secondary scrub. 4,500 ft. 26.vii.62. *S & L* 7016.

*__Thelypteris dentata__ (Forsk.) Allen, Fl. N. Zealand, **1**: 52 (1961).

Polypodium dentatum Forsk., Fl. Aegypt. Arab.: 185 (1775). Type from Yemen.

Dryopteris dentata (Forsk.) C. Chr. in Vid. Selsk. Skr., Afd. 8, **6**: 24 (1920).

Cyclosorus dentatus (Forsk.) Ching. in Bull. Fan Mem. Inst. Biol. Bot., **8**: 206 (1938).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional in dense undergrowth on forest margin. 3,400 ft. 19.vii.62. S & L 6939.

ZAMBÉZIA: Namuli Mtn. (S.W. sector), Châ Moçambique. Occasional in gallery forest and as a weed in tea plantation. 2,700 ft. 29.vii.62. S & L 7076.

Thelypteris quadrangularis (Fée) Schelpe comb. nov.

Nephrodium quadrangulare Fée, Gen. Fil.: 308 (1852). Type from British Guiana. (Basionym).

Dryopteris quadrangularis (Fée) Alston in Journ. of Bot., **75**: 253 (1937).

Cyclosorus quadrangularis (Fée) Tard. in Not. Syst., **14**: 345 (1952).

Dryopteris contigua Rosenst. in Meded. Rijksherb. Leiden, **31**: 8 (1917). Type from Borneo.

Cyclosorus contiguus (Rosenst.) Copel., Gen. Fil.: 142 (1947).

MOÇAMBIQUE: Ribaué Mtn. (E. sector). Rare in deep shade in gully forest. 3,600 ft. 19.vii.62. S & L 6925.

ZAMBEZIA: Namuli Mtn. (S.W. sector), Châ Moçambique. Occasional in gallery forest. Rhizome erect. 2,700 ft. 29.vii.62. S & L 7077.

A pantropical species, as construed here, which is intermediate between the genera Thelypteris Schmidel and Cyclosorus Link. The author is indebted to Prof. R. E. Holttum for his opinion on the conspecificity of *T. quadrangularis* and *C. contiguus*.

LOMARIOPSIDACEAE

*__Elaphoglossum acrostichoides__ (Hook. & Grev.) Schelpe comb. nov.

Vittaria acrostichoides Hook. & Grev., Icon. Fil.: t.186 (1830). Type from Cape Province. (Basionym)

Drymoglossum acrostichoides (Hook. & Grev.) Moore, Index: 31 (1857).

Elaphoglossum preussii Hieron. in Bot. Jahrb., **46**: 402 (1911). Type from West Africa.

ZAMBZÉIA: Namuli Mtn. (N.W. sector). Locally common low-level epiphyte in gallery forest overhanging river. 4,500 ft. 26.vii.62. *S & L* 7048.

This taxon has been confused previously with the American *E. petiolatum* (Sw.) Urban by Sim (1915), with the St. Helena and south-western Cape Province *E. conforme* (Sw.) Schott. by Adamson (1942) and with the southern Cape Province *E. angustatum* (Schrad.) Hieron. by Alston & Schelpe (1952). A good illustration of *E. acrostichoides* is Sim's (1915) plate 149, fig. 2. The fertile frond in the type, seen at Kew, is incompletely acrostichoid.

Elaphoglossum macropodium (Fée) Moore, Ind. Fil.: 11 (1857).

Acrostichum macropodium Fée, Mém. Fam. Foug. **2**: Acrost.: 30, t.6, fig. 2 (1845). Type from Réunion.

Elaphoglossum conforme (Sw.) Schott. var. *latifolium* Sim, Ferns S. Afr., ed. ii: 286 (1915). Varietal type from Natal and Rhodesia.

ZAMBÉZIA: Namuli Mtn. (N.W. sector). Locally common low-level epiphyte in gallery forest overhanging river. Sterile fronds elliptic 24 cm. long, 4·8 cm. broad; stipe 15 cm. long; rhizome scales lanceolate, pale brown 6·5 mm. long; no sporulating fronds found. 4,500 ft. 26.vii.62. *S & L* 7046.

In the south-east African plants the stipes of the sterile fronds are about as long as the laminae, whereas in the Réunion specimens seen the stipes are half the length of the laminae.

***Elaphoglossum salicifolium** (Willd. ex Kaulf.) Alston in Exell, Cat. S. Tomé: 92 (1944).

Acrostichum salicifolium Willd. ex Kaulf., Enum. Fil.: 58 (1824).

Elaphoglossum viscosum (Sw.) Schott. var. *salicifolium* (Willd. ex Kaulf.) Hieron. ex Brause in Wiss. Ergebn. Deutsch. Zentral-Afr. Exped. 1907–1908, **2**: 35 (1910).

Elaphoglossum petiolatum (Sw.) Urban var. *salicifolium* (Willd. ex Kaulf.) C. Chr. in Dansk. bot. Arkiv, **7**: 168 (1932).

ZAMBÉZIA: Namuli Mtn. (N.W. sector). Locally common low-level epiphyte in gallery forest overhanging river. 4,500 ft. 26.vii.62. *S & L* 7047; Namuli Mtn. (S.W. sector), Rio Licungo. Locally frequent low-level epiphyte in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7092.

Elaphoglossum spathulatum (Bory) Moore var. **uluguruense** (Reimers) Schelpe stat. nov. et comb. nov.

Elaphoglossum uluguruense Reimers in Notizbl. Bot. Gart. Berlin, **12**: 80 (1934). Type from Tanganyika. (Basionym)

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Locally common on shaded rock face on streambank in gallery forest. 4,300 ft. 26.vii.62. *S & L* 7035; Namuli Mtn. (S.W. sector), Rio Licungo. Locally abundant in deep shade on mossy boulders in tall riverine forest. 3,200 ft. 29.vii.62. *S & L* 7094.

Most of the sterile fronds in the Tanganyikan and Moçambique specimens seen are narrower than in the Mascarene plants available; their fertile fronds are approximately of the same shape. However, the South African specimens have even shorter and broader sterile laminae and conspicuously shorter and broader fertile laminae.

ASPIDIACEAE

Dryopteris inaequalis (Schlechtend.) O. Kuntze, Rev. Gen. Pl., **2**: 813 (1891).

Aspidium inaequale Schlechtend., Adumbr.: 23, t.12 (1825). Type from Cape Province.

Lastrea inaequalis (Schlechtend.) Presl, Tentamen: 77 (1836).

Nephrodium inaequale (Schlechtend.) Hook., Sp. Fil., **4**: 125 (1862) non Schrad. (1824)

Polystichum inaequale (Schlechtend.) Keys., Polypod. Cyath. Hb. Bung.: 44 (1873).

Lastrea pentagona Moore in Journ. of Bot., **5**: 227 (1853). Type from Natal.

Nephrodium pentheri Krasser in Ann. Hofmus. Wien, **15**: 5, t.2, figs. 1—5 (1900). Type from South Africa.

Dryopteris pentheri (Krasser) C. Chr., Ind. Fil.: 284 (1905).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional in undergrowth of Brachystegia woodland. 3,800 ft. 19.vii.62. *S & L* 6926.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional on roadside earthbank on margin of gully forest. 2,500 ft. 25.vii.62. *S & L* 7002.

Dryopteris athamantica (Kunze) O. Kuntze, Rev. Gen. Pl., **2**: 812 (1891).

Aspidium athamanticum Kunze in Linnaea, **18**: 123 (1844). Type from Natal.

Lastrea athamantica (Kunze) Moore in Journ. of Bot., **5**: 311 (1853).

Nephrodium athamanticum (Kunze) Hook., Sp. Fil., **4**: 125, t.258 (1862).

Lastrea plantii Moore in Journ. of Bot., **5**: 227 (1853). Type from Natal.

Nephrodium eurylepium Peter in Fedde, Rep. Sp. Nov., Beih., **40**: 57 (1929). Type from Tanganyika.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Occasional on roadside bank. 2,500 ft. 25.vii.62. *S & L* 7000.

Tectaria gemmifera (Fée) Alston in Journ. of Bot., **77**: 228 (1939).

Sagenia gemmifera Fée, Gen. Fil.: 313 (1852). Type from Madagascar.

Aspidium coadunatum Wall. ex Hook. var. *gemmiferum* (Fée) Mett. ex Kuhn, Fil. Afr.: 128 (1868).

MOÇAMBIQUE: Ribauè Mtn. (E. sector). Occasional on floor of gully forest. 3,500 ft. 19.vii.62. *S & L* 6937.

ZAMBÉZIA: Namuli Mtn. (E. sector). Occasional in moist scrub. 3,800 ft. 27.vii.62. *S & L* 6937; Namuli Mtn. (S.W. sector), Rio Licungo. Locally frequent in undergrowth of tall riverine forest in deep shade. 3,200 ft. 29.vii.62. *S & L* 7032.

BLECHNACEAE

Blechnum attenuatum (Sw.) Mett., Fil. Hort. Bot. Lips.: 64, t.3, figs 1—6 (1856).

Onoclea attenuata (Sw.) in Schrad. Journ., **1800** (2): 73 (1801). Type from Mauritius.

Lomaria attenuata (Sw.) Willd. in L., Sp. Pl., ed. iv, **5**: 290 (1810).

Spicanta attenuata (Sw.) O. Kuutze, Rev. Gen. Pl. 821 (1891).

Lomaria heterophylla Desv. in Mag. Ges. Naturf. Berl., **5**: 330 (1811). Type from Cape Province.

Blechnum heterophyllum (Desv.) Schlechtend., Adumbr.: 37 (1827).

Lomaria gigantea Kaulf., Enum. Fil.: 150 (1824). Type from Cape Province.

Blechnum giganteum (Kaulf.) Schlechtend., Adumbr.: 36, t.20, 22 (1827).

Lomaria decipiens Pappe & Raws., Syn. Fil. Afr. Austr.: 27 (1858). Type from Cape Province.

ZAMBÉZIA: Namuli Mtn. (S.W. sector). Rare on floor of gully forest. 4,300 ft. 26.vii.62. *S & L* 7032.

B. attenuatum is construed here in a wide sense. The specimen from Namuli is the South African form of the species which has larger fronds and a more condensed rhizome than in the limited Mascarene material seen. It is possible that if a wider range of complete material from the type locality becomes available the Southern African form may have to be treated as a distinct variety or subspecies.

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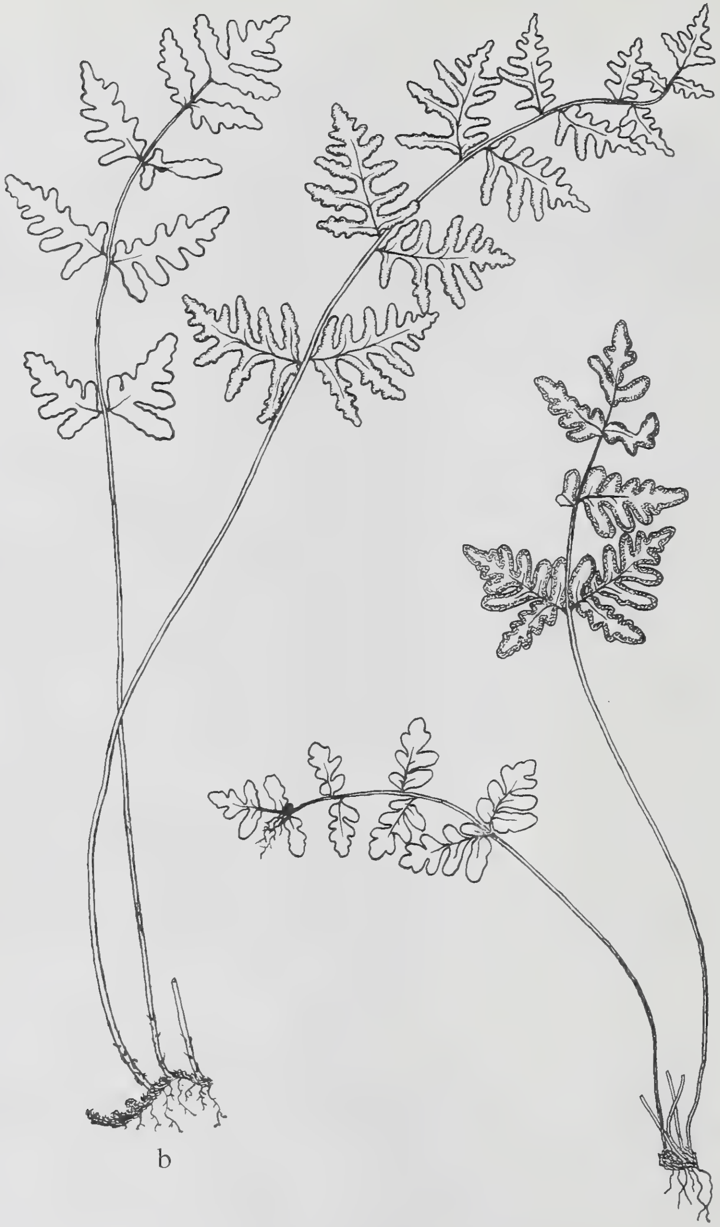

FIG. 1. (*a*) *Notholaena leachii* Schelpe (luxuriant form).
(*b*) *Cheilanthes mossambicensis* Schelpe.

(x$\frac{1}{2}$)

THE INFLUENCE OF MICRO-NUTRIENT DEFICIENCY UPON THE WILTING RATE OF YOUNG WHEAT

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Introduction

Mineral nutrition is known to influence wilting in higher plants, but little accurate information is available concerning the effect that lack of essential minor elements have upon this process. It is quite clear that these elements play a very appreciable role in the water relation of plants, and both field (2, 3, 4, 7) and experimental investigations (1, 5, 9) have shown that deficiencies of these elements result in a decreased rate of transpiration.

Less is known on the influence of deficiencies upon wilting, and some of this information is apparently contradictory. As long ago as 1937, Willis and Piland (10) observed that in hot weather boron deficient romaine lettuce wilted very severely while plants grown on borax treated soil did not. Schütte (8) demonstrated experimentally that in the radish deficiency of boron, copper, manganese and zinc resulted in increased susceptibility to wilting. On the other hand, Leaf studying the influence of boron on tobacco (5) and Baker, Gauch and Dugger (1) working with snap-beans, sunflowers and tomatoes, found that deficiency of boron resulted in a *decreased* rate of desiccation in excised leaves. However, rate of desiccation is not necessarily synonymous with wilting. The latter workers observed that during periods of sudden heat marked wilting occurred in normal beans but none in the boron deficient ones. This apparently contradictory state of affairs has not been explained.

In this investigation, the influence of deficiencies of boron, copper, manganese and zinc upon the wilting rate of young wheat was investigated. Under South African conditions, deficient plants in the field are more prone to wilt than normal ones. An effort was made to assess wilting rates quantitatively and the experiments were conducted in autumn, winter and spring in an effort to observe if seasonal variations were of any significance.

METHODS

The experimental plant used was a wheat *Triticum vulgare* 'VERNAL', which grew well in sand culture. The wheat was germinated in dishes of acid washed sand moistened with de-ionised water, and transplanted to pots of acid washed sand when 3·5 cm. tall, at the rate of 20 plants per pot. The seedlings were irrigated with a slightly modified Robbins' Solution (6) every two days. The control plants received all essential nutrient elements, while deficient plants received all essential elements except the one being investigated.

The following five treatments were used—

Control	Full nutrition
— B	Boron deficient
— Cu	Copper deficient
— Mn	Manganese deficient
— Zn	Zinc deficient

The plants were grown in an unheated glass-house, with 80 plants per treatment. The experiment was repeated three times, in April, in June and in September and the relevant data on temperature, relative humidity and evaporating power of the air was recorded.

Wilting was determined very simply. After 12 days, half the plants were removed from the sand with their rooting systems intact. The rest were removed and studied after 24 days. Three hours previous to their removal from the sand, the pots had been irrigated. All the plants used were turgid and completely normal in appearance. *No obvious visual signs of deficiency could be observed in any of the plants.* The entire plant was inserted into a small wire tripod 10 cm. high and completely exposed to the surrounding atmosphere. The time taken for the leaves to droop was recorded and this drooping of the leaves and stem was taken as the criterion of wilting. Plants were wilted in batches of 10 and the number of wilted plants was recorded every five minutes for 40 minutes. This made the results obtained readily amenable to statistical analysis.

RESULTS

In spite of the fact that the method used to determine the rate of wilting appears to be rather subjective, it was found to yield very consistent results. There was very little variation within any one treatment, as the analysis of Mean Squares showed, and the results were consistent within the treatments at the 0·1% level. Again, the results obtained in autumn, winter and spring all gave similar results (in June no wilting tests were undertaken on 24 day old plants).

Table I gives the details of the wilting experiments. It is quite obvious that all the deficient plants wilt more rapidly than the controls and also that the rate of wilting is similar in all the treatments of the same age, irrespective of the time of the year at which they were performed.

TABLE I

Relationship between the length of time wheat plants have been exposed to wilting and the number of wilted plants in any given treatment. Each batch consisted of 40 plants (subdivided into four groups of 10 for statistical purposes) and was exposed for 40 minutes.

Columns A (April), B (June) and C (September) refer to the season of the year in which the experiment was conducted.

Time in Minutes	Control			−B			−Cu			−Mn			−Zn		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
12 DAY OLD WHEAT															
10	3	2	6	6	3	9	15	9	20	15	7	16	24	16	24
15	7	5	9	14	7	14	26	21	29	26	15	27	30	23	32
20	9	9	9	16	8	14	28	25	30	27	16	28	31	26	82
25	12	9	11	16	9	15	30	25	34	29	18	30	33	27	35
30	13	11	12	18	12	15	33	29	35	32	22	33	33	30	37
35	15	13	13	18	12	18	34	32	38	33	25	33	35	33	38
40	15	14	14	18	13	20	36	33	40	33	26	36	36	33	39
24 DAY OLD WHEAT															
10	7	—	9	19	—	17	10	—	18	6	—	12	12	—	18
15	11	—	15	27	—	33	20	—	28	14	—	21	20	—	29
20	11	—	15	28	—	33	22	—	29	16	—	24	23	—	29
25	13	—	17	32	—	34	29	—	31	20	—	25	27	—	31
30	16	—	19	34	—	35	30	—	33	24	—	28	30	—	32
35	17	—	21	35	—	37	33	—	36	27	—	32	33	—	33
40	18	—	22	37	—	38	36	—	37	28	—	33	37	—	35

A — April Temperature 29°C, evaporating power of the air 0·46 kg.$H_2O/m^2/hr$.
B — June Temperature 24°C, evaporating power of the air 0·24 kg.$H_2O/m^2/hr$.
C — September Temperature 30°C, evaporating power of the air 0·52 kg.$H_2O/m^2/hr$.

The difference between the percentage of wilted plants after 40 minutes in the controls and in deficient plants is highly significant. In 12 day old plants the level of significance is 0·1% for —Cu, —Mn and —Zn, while —B is 1·0% (except in June when bad weather disturbed the experiment). —Cu, —Mn and —Zn do not differ significantly from each other but do from —B. In 24 day old plants, all treatments differed from the controls at the 1·0% level, while —Mn differed from —B, —Cu, —Zn at the 5% level, the latter not differing significantly among themselves.

The graphs on Fig. I, in which percentage wilting is plotted against time, clearly depict the wilting rate of these plants. The rate of wilting in the control plants is much slower than that of the deficient material. In 12 day old wheat, the rate of wilting in the —B treatment is significantly slower than that in the other deficient treatments, yet in 24 day old plants —B shows the most rapid rate of wilting of all the plants. In these 24 day old plants the pattern of —Mn

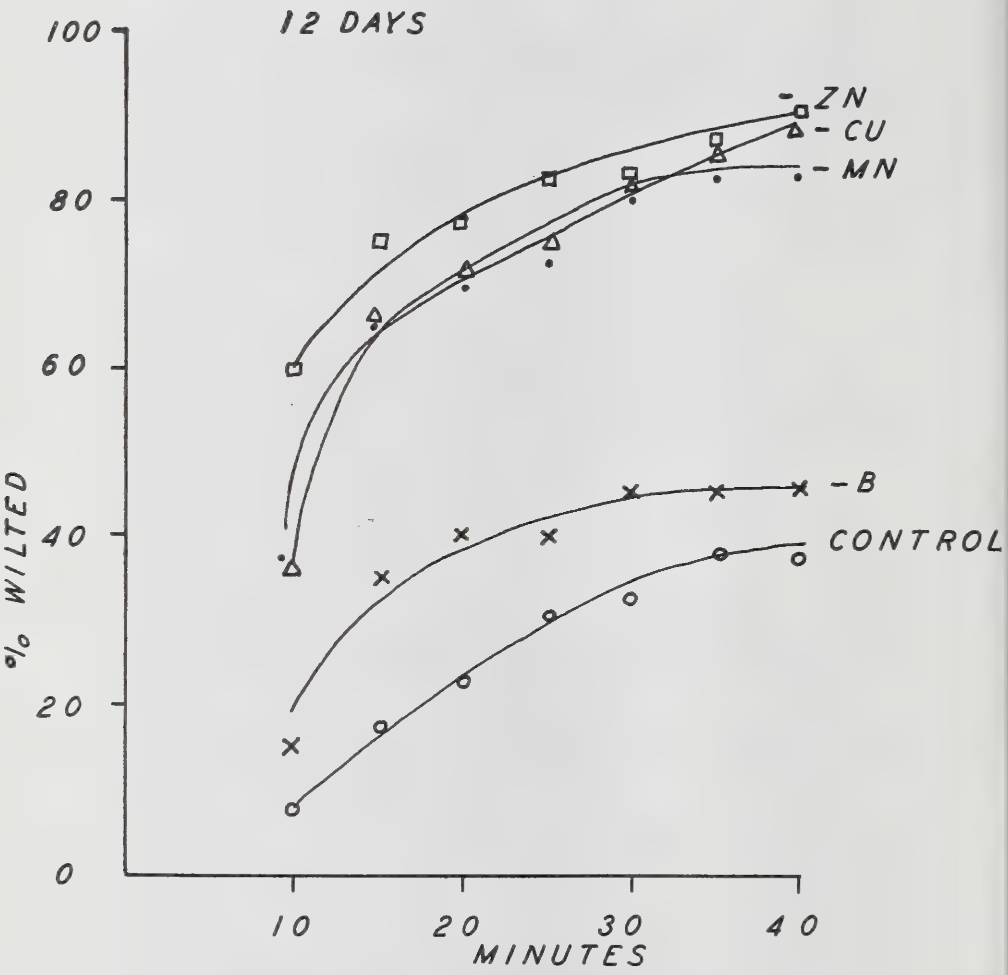

FIG. 1A. *Wilting rate in deficient and control wheat.*

The percentage of wilted plants is plotted against time in minutes. It is clear both in 12 and 24 day old plants that the wilting rate of the controls is the lowest of all the treatments, while the rate in deficient wheat is always significantly higher.

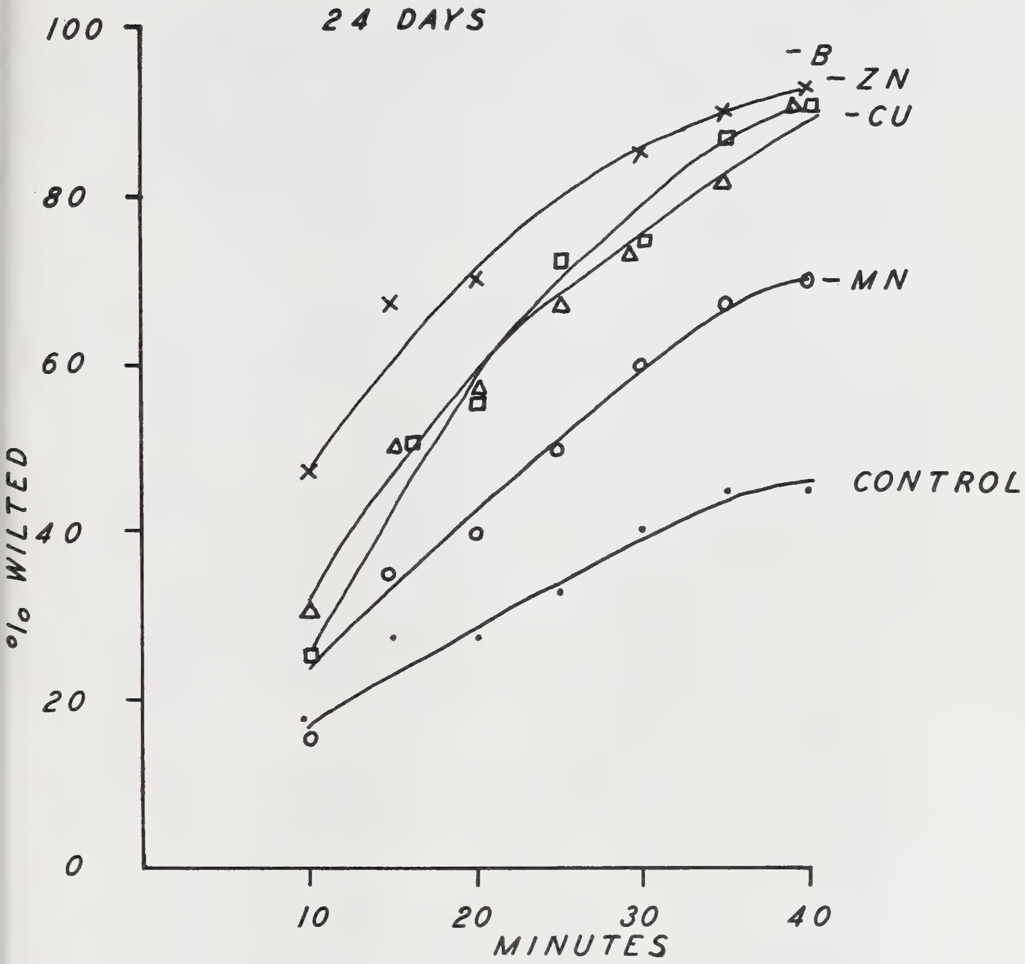

FIG. 1B. *Wilting rate in deficient and control wheat.*

The behaviour of boron deficient plants is particularly anomalous as at 12 days their rate of wilting is low yet at 24 days it is highest of all the treatments. The rate of wilting in manganese deficiency is also influenced by time but to a much smaller extent.

Data plotted was obtained from experiments conducted in April. Experiments conducted at other times gave similar results.

also changes and its wilting rate is slower than that of the other deficient treatments.

The behaviour of —B differs considerably from that of other treatments in that its influence upon the wilting rate of 12 day old plants is quite distinct from that upon 24 day old wheat. It is also anomalous in that the wilting curve is not a smooth one but frequently appears to be characterized by a series of steps, which is not the case in any of the other treatments. The consistency with which this jerky response occurs appears to preclude its being fortuitous and the design of the experiment and the number of plants used were adequate to ensure that it is a genuine response.

DISCUSSION

This experiment clearly demonstrates that in young wheat, even before visual symptoms of deficiency are apparent, deficiencies of boron, copper, manganese and zinc increase proneness to wilting. This is in keeping with field observations made in South Africa. Previous experiments with radishes had shown a similar picture, (8). The anomalous behaviour of boron in this investigation, in which the wilting pattern of 12 day old wheat is quite distinct from that of 24 day old plants, is very hard to explain. Similar behaviour had previously been observed (8) but no significance had been attached to the observation. This marked alteration in behaviour with age, as well as the completely different nature of the wilting curve, appears to indicate that boron plays an unusual and, as yet, unexplained role in wilting and other aspects of water relations. As far as wilting is concerned, the behaviour of boron deficient wheat is quite distinct from the plants studied by Leaf (5) or Baker, Gauch and Duggar (1).

The results of this experiment are also of interest from another point of view, as they indicate some complex problems in water relations. Other investigations have shown that deficiency of trace elements results in a decreased rate of transpiration (1, 2, 3, 4, 5, 7, 9). Therefore, it seems likely that deficiencies either hamper the absorption or the conduction of water by the plant, as it is unlikely that increased proneness to wilting can be due to increased and excessive loss of water when the transpiration rate is decreased. In this context, it must be stressed that in young material like that used in this experiment, marked anatomical changes which may help to explain this state of affairs, have not yet taken place.

It is clear that further investigations must be undertaken to clarify our knowledge on the influence that deficiencies have upon the water relations of higher plants.

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EUPHORBIA SPECIES FROM THE FLORA ZAMBESIACA AREA III.

L. C. Leach

(With Plates XXVI–XXVII)

Euphorbia fortissima Leach, sp. nov.

E. cooperi N.E. Brown affinis sed ramis persistentibus et pauciore angulatis (3–4), pedunculis, ramis cymarum et pedicellis longioribus, capsula maxime grandiore ex involucro multo exserta et glandulis concavis reniformibus differt.

Arbor candelabriformis succulenta spinosa, c. 5 m. (7 m.) alta, trunco crasso, c. 22·5 cm. (30 cm.) diam., ramis numerosis persistentibus patenti-ascendentibus, alatis, ad medium rare ramificis, ad apicem saepe perbreviter parce ramulosis. *Rami* usque 5 m. longi, 3—4 (plerumque 3) alatis, in segmenta constricti, segmentis 4·5—9 cm. latis, 3—10cm. longis versus apicem ramorum, usque 20 cm. longis ad basem, subcircularis vel late ovatis vel rariter late ellipticis, apicibus obtusis emarginatis; alae crassae, marginibus continuis corneis 3—8 mm. latis, pallide brunneis, demum griseis, spinis binis fortibus divergentibus 2—7 mm. (10 mm.) longis armatis; rami secundarii et ramuli ex marginibus alarum producti; ramuli erecti 3—5 alatis. *Folia* exigua sessilia ovata acuta caduca, cicatricibus inconspicuis. *Inflorescentia* cymosa; cymae 1—3, pedunculatae, cyathiis 3, verticaliter dispositis, c. 5 mm. supra spinas productae; pedunculus 7—10 mm. longus usque 5 mm. crassus, bibracteatus; bracteae plerumque patulae, plus minusve late ovatae, plerumque aliquantum scissae, margine minute denticulato, c. 7 mm. latae, 6 mm. longae; cyathium medium masculinum deciduum; cyathia lateralia bisexualia, ramis cymarum 5—8 mm. longis usque 4·5 mm. crassis; bracteae plus minusve transverse latissime ellipticae obtuse carinatae, aliquantum scissae, c. 7·5 mm. latae, 5 mm. longae, margine minute denticulato. *Involucrum* crateriforme glabrum, 4—5 mm. longum, 10—11 mm. diam. glandulis inclusis; lobis 5, erectis breviter fimbriatis subquadratis leviter carinatis c. 3 mm. latis; glandulae 5, patentes reniformes integrae valde contiguae leviter concavae marginibus perbreviter erectis, minute rugulosae flavae, c. 5 mm. latae, 2·5 mm. longae. *Flores masculi* numerosi (c. 60) 5-fasciculati, bracteolis fimbriatis; pedicelli 4·5 mm. longi; filamenta c. 1·5 mm. longa; bracteae fasciculares fimbriatae laceratae. *Ovarium* anguste obovoideum stipitatum, ex involucro mox exsertum, perianthio trilobato lobis dentatis. *Styli* patuli, c. 2·25 mm. longi, libri fere ad basem vel partim in columnam connati, apicibus crassis rugulosis emarginatis. *Capsula* trilobata obtuse triangularis, apice et basi truncato, 18—24 mm. diam., 9—10·5 mm. alta, ex involucro exserta, pedicello crasso 11—13 mm. (ad 17·5 mm.) longo, perianthio irregulariter deltato dentato. *Semen* subglobosum, c. 4 mm. longum, 3·5 mm. diam. laeve.

Type: *L. C. Leach* 11616 (BM: BRLU: COI: FHO: G: K: LISC: MO: PRE: SRGH, holotype).

S. RHODESIA. Wankie Distr.: Deka Riv., ± 10 miles S of junction with Zambesi Riv., fr. 26. iv. 1959, *L. C. Leach* 8963 (PRE: SRGH); Lutope-Gwaai Riv. junction, in *Euphorbia-Combretum* thicket, 15 foot tall, main trunk short, fl. 26. ii. 1963, *H. Wild* 6022 (G: K: SRGH); Shashachunga Riv. near junction with Deka Riv., open *Colophospermum mopane—Commiphora* savanna, alt. ± 2,350′, approx. 26° 29′ E, 18° 15′ S, fr. 30. iii. 1963, *L. C. Leach* 11616 (BM: BRLU: COI: FHO: G: K: LISC: MO: PRE: SRGH); ibid., fl. 6. iii. 1964 *L. C. Leach* 12117 (BM: BRLU: G: K: LISC: PRE: SRGH); Deka—Zambezi Riv. junction, alt. ± 2,200′, fr. 31. iii. 1963, *L. C. Leach* 11625 (G: K: PRE); Nashome, ± 17 miles W of Wankie, steep stony hillside, alt. ± 2,300′, fr. 31. iii. 1963, *L. C. Leach* 11626 (K: PRE); ibid., fl. 27. ii. 1964, *R. B. Drummond* 8441 (SRGH); Lukosi Riv., ± 10 miles S of Wankie, steep rocky hillside, fr. 7. iii. 1964, *L. C. Leach* 12124 (BM: SRGH).

(Note: flowering material *L. C. Leach* 12117 was used to complete the description of the inflorescence.)

N. RHODESIA. Gwembe Distr.: Sinazongwe, Karroo sandstone, in *Mopane-Commiphora-Combretum* association, alt. ± 1,650′, fl. & fr. 10. vi. 1963, *W. R. Bainbridge* 836 (SRGH); Livingstone Distr.: Candelabra Pool, near 5th. Gorge, below Victoria Falls, on basalt rocks, fl. & fr. 7. iii. 1964, *L. C. Leach* 12121 (K: LISC: PRE: SRGH).

E. fortissima appears to be most closely related to *E cooperi*, particularly to the more southerly forms of that species, there are however, marked and important differences in the inflorescence with its long peduncles and cyme branches and its very much larger capsule far exserted on a stout pedicel; the total length of the cyme sometimes reaches 4 cm., very different from the subsessile cymes and very shortly exserted capsules of *E. cooperi*.

The stoutly winged, dark green branches of the new species have fewer angles (3 predominating) than do those of *E. cooperi*, while due to their persistent nature, a nude trunk of any appreciable height is a rarity; the lower branches attain a length of 4—5 m. with 35—40 segments, the diameter of the plants then frequently exceeding their height, Plate I, fig. 2.

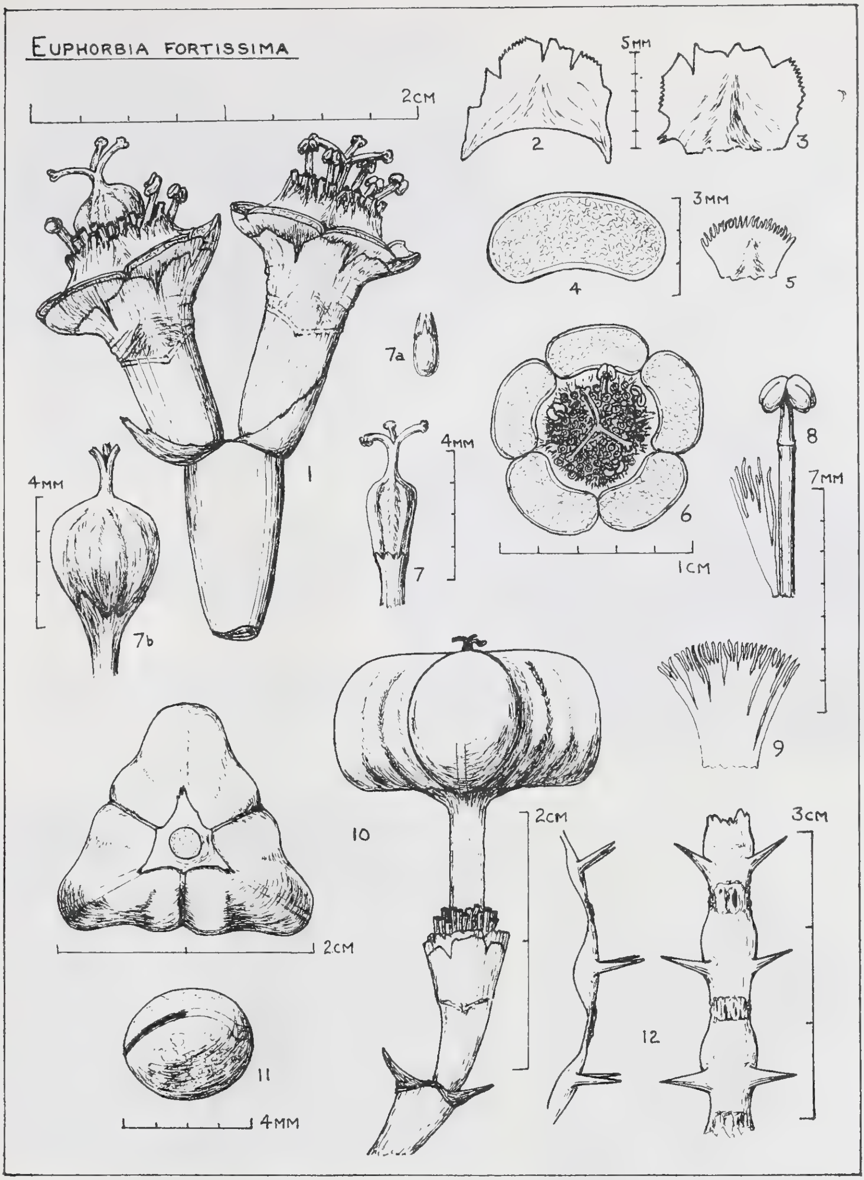


FIG. 1. *E. fortissima* Leach

(1) Pedunculate cyme.
(2) Peduncular bract.
(3) Involucral bract.
(4) Gland.
(5) Lobe.
(6) Involucre.
(7) Ovary and ovule.
(8) Staminate flower and bracteole.
(9) Fascicular bract.
(10) Capsule.
(11) Seed.
(12) Wing margin with spines.

The exceptional tree which gave rise to the name "Candelabra Pool" at the Victoria Falls has developed a nude trunk 3 m. or more in height, see Plate I, fig. 4, and it is thought that it must be of very considerable age (5 year old seedlings have shewn no inclination to produce branches). Communities seldom consist of more than a dozen individuals and despite several rather exhaustive searches, no juveniles (apart from one or two seen at the Candelabra Pool) have been found. The scarcity of seedlings is in no way caused by poor viability (small quantities of seed collected in 1959 and 1963 gave almost 100% germination) but is probably due to the fact that the ripe seed is produced towards the end of the rains, giving the maximum opportunity for mortality from various causes (*Euphorbia* seeds seem to be very much relished by the doves!) before the next season; communities of *E. angularis* Kl. in the vicinity, with fruits ripening very much later, usually consist of dense stands of plants of all ages together with numerous juveniles.

E. fortissima seems in some ways to provide a link between *E. cooperi* and *E. ingens* Meyer: the persistent branches with rather subcircular segments and stout wings which become obsolescent towards the base, the pedunculate cymes and the subglobose young fruits all remind one quite strongly of the latter species.

The distribution of the species appears to be in the vicinity of the Zambesi River and its tributaries, from immediately below the Victoria Falls to as far down as Sinazongwe on Lake Kariba: it seems worthy of note that the ubiquitous *E. ingens* is rather rare in this area.

Plant: a candelabriform, succulent, spiny, small tree c. 5 m. high (7 m.) with a short stout trunk c. 22·5 cm (30 cm.) diam. and numerous spreading ascending, persistent, winged branches which are simple or occasionally rebranched from about the middle, usually much exceeding the central trunk and often bearing 1—3 very short erect terminal branchlets. *Branches* 3—4 winged (usually 3), up to 5 m. long, constricted into 35—40 subcircular, broadly ovate or elliptic segments which are 4·5—9 cm. wide, 3—10 cm. long towards the obtuse emarginate apex of the branches, lengthening towards the base to up to 20 cm. long with the wings becoming obsolescent; the stout wing-like angles are provided with a broad continuous more or less even, pale brown (grey with age) horny margin 3—8 mm. wide, armed with strong, diverging, paired spines 2—7 mm. long (10 mm.); secondary branchlets and terminal branchlets are produced from the margins of the wings at the broadest part of the segments; terminal branchlets erect, 3—5 winged, usually very short. *Leaves* minute, sessile, ovate acute, very fleeting, leaving very inconspicuous scars shortly above the spine pairs. *Inflorescense* cymose; pedunculate cymes 1—3, each with 3 cyathia, produced from the flowering eye c. 5 mm. above the spine pairs; peduncle bibracteate, 7—10 mm. long, up to 5 mm. thick, somewhat laterally compressed; bracts usually

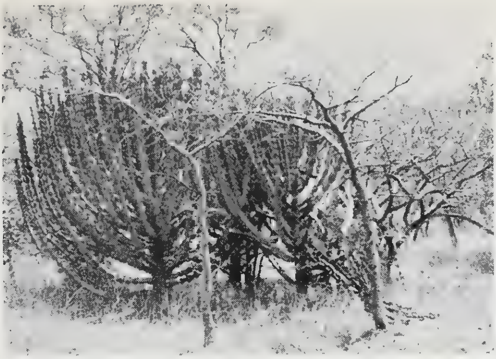


Fig. 1. Typical plants at the type locality near Wankie, S. Rhodesia.

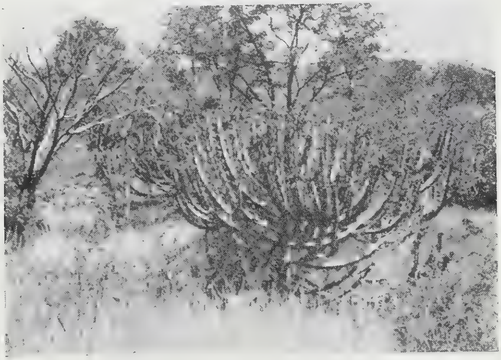


Fig. 2. Tree with very spreading branches at the type locality.

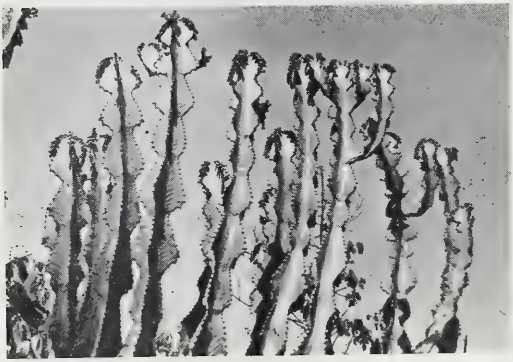


Fig. 3. Apical portion of branches, shewing segments.

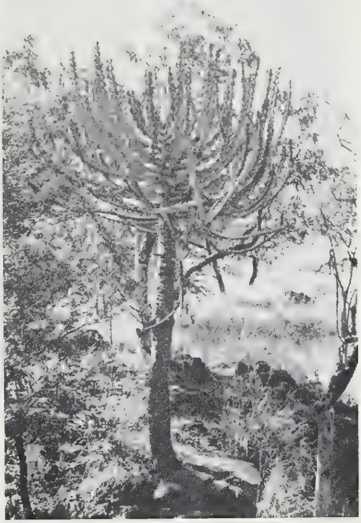


Fig. 4. Tree with exceptionally tall nude trunk at the Candelabra Pool, Victoria Falls, N. Rhodesia.

PLATE XXVI. *Euphorbia fortissima* Leach

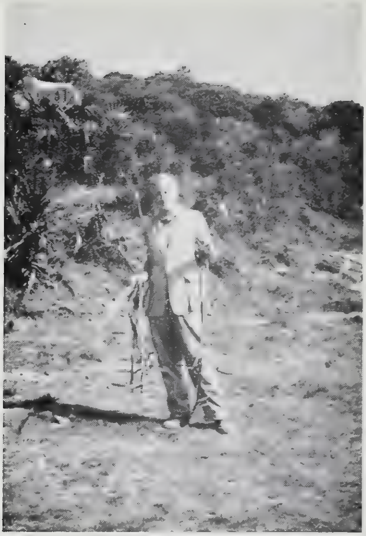


Fig. 1. Col. R. D. A. Bayliss with plants of *E. baylissii* with the type locality in background.

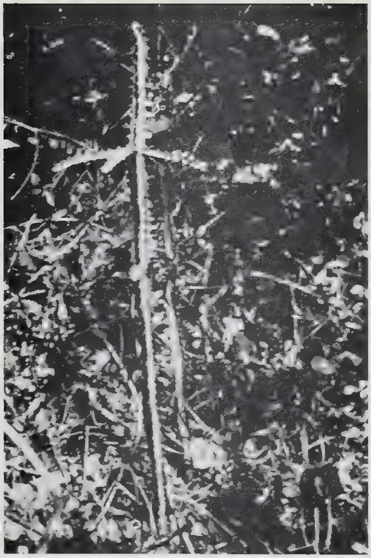


Fig. 2. Plant in heavy shade of natural habitat.

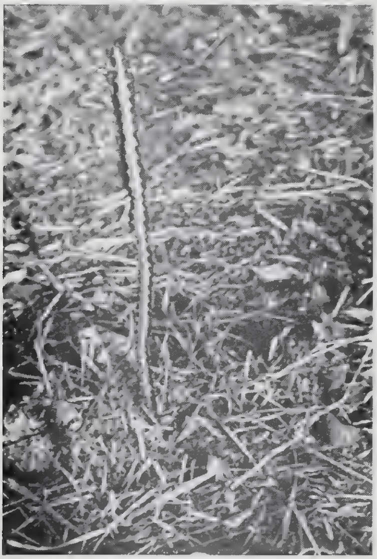


Fig. 3. Typically marked young plant in flower (removed from habitat for photograph).

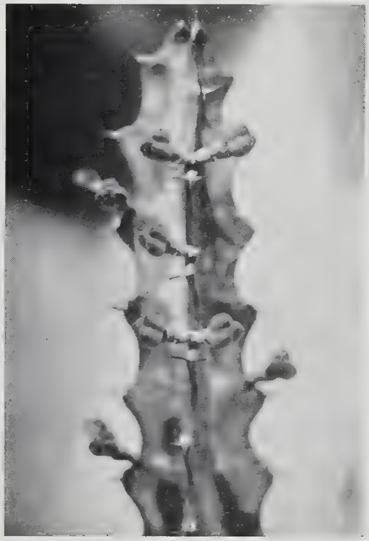


Fig. 4. Apex of stem, in fruit.

PLATE XXVII. *Euphorbia baylissii* Leach

spreading, more or less broadly ovate, usually somewhat split, with a minutely denticulate margin; the 3 cyathia of each cyme are arranged in a plane parallel with the axis of the branch; the central cyathium male deciduous; the lateral bisexual cyathia are borne on stout cyme branches which are 5—8 mm. long and up to 4·5 mm. thick; bracts more or less transversely very broadly elliptic, obtusely keeled, usually with the minutely denticulate margin split, c. 7·5 mm. wide, 5 mm. long. *Involucre* cup-shaped, glabrous, 4—5 mm. long, 10—11 mm. diam. including the glands, with 5 erect, shortly fimbriate, subquadrate, slightly keeled lobes c. 3 mm. wide; glands spreading, reniform, entire, closely contiguous, slightly concave with the margins shortly erect, minutely rugulose, yellow, c. 5 mm. wide, 2·5 mm. long. *Male flowers* numerous (c. 60) with fimbriate bracteoles, arranged in 5 bracteate fascicles with fimbriate lacerate bracts; pedicels 4·5 mm. long; filaments c. 1·5 mm. long. *Ovary* narrowly obovoid, stipitate, with a 3 lobed dentate perianth, very soon exserted from the involucre; ovule suspended under a minutely denticulate, 2 lobed fleshy hood. *Styles* spreading, c. 2·25 mm. long, free almost to the base or partly united into a column for up to half their length, with thickened emarginate rugulose apices. *Capsule* 3-lobed, obtusely triangular (becoming deeply 3-lobed immediately before dehiscence) truncate at both the apex and the base, 18—24 mm. diam., 9—10·5 mm. high, held erect on a stout pedicel 11—13 mm. (17 mm.) long with an irregularly deltate dentate perianth. *Seed* subglobose, c. 4 mm. long, 3·5 mm. diam., smooth, olive green shading to dark olive brown, partially and patchily covered with a waxy crystalline appearing white coating which imparts a variably mottled appearance, suture dark brown.

Euphorbia baylissii Leach, sp. nov.

E. ambroseae Leach affinis sed podariis vix decurrentibus haud confluentibus, spinis binis armatis, angulis alatis sinuato-dentatis, foliis multo minoribus, stylis brevioribus, ramis cymarum et pedicellis longioribus facile distinguenda.

Frutex succulentus spinosus, ·8 (perrariter ad 1·8 m.) altus, superne parce ramosus, caule plerumque uno. *Caulis* et *rami* interdum leviter constricti, angulis 4, prominenter sinuato-dentatis valde alatis; alae tenuissimae, ad 1·2 cm. latae dentibus exclusis; dentes plus minusve triangulares vel truncati, ad 4·5 mm. alti, 8—17 mm. distantes. *Rami* et *ramuli* horizontaliter patuli vel ascendentes, ex constrictionibus vel ex marginibus alarum producti; rami plerumque c. 1·5 cm. crassi. *Podaria* plus minusve obovata vix decurrentia haud confluentia, spinis binis acicularibus patulis divergentibus, 1·5—4·5 mm. longis armata. *Folia* exigua sessilia ovata acuta mox decidua; cicatrices foliorum inconspicuae spinulis binis minutis praeditae. *Inflorescentia* cymosa axillaris subsessilis vel perbreviter pedunculata, 1—3·5 mm. supra podaria producta, cyathiis 3

horizontaliter dispositis; cyathium medium plerumque masculinum deciduum interdum bisexuale; cyathia lateralia semper bisexualia. Pedunculus bibracteatus, c. 1·5 mm. longus, 2 mm. crassus; bracteae plus minusve transverse late oblongae obtusae vel truncatae, emarginatae vel subintegrae, ramis cymarum 2·5—3 mm. longis, bracteis subquadratis obtusis. *Involucrum* latissime infundibuliforme, 5·5—6 mm. diam., c. 2·5 mm. longum, glabrum, lobis 5 imbricatis, transverse ellipticis, irregulariter denticulatis; glandulae 5, transverse oblongae, c. 3 mm. latae, patulae, valde contiguae, leviter concavae, rugulosae luridae. *Flores musculini* 15, 5-fasciculati, bracteolis filiformibus fimbriatis; bracteae fasciculares oblongae laceratae fimbriatae. *Ovarium* glabrum, obtuse trigonum, ex involucro partim exsertum; styli patuli, libri e basi, c. 1·25 mm. longi, apictbus paulo crassis subcapitatis rugulosis. *Capsula* trilobata, 3·5—4 mm. longa 4·5—5·5 mm. diam., denique perbreviter exserta ex involucro pedicello crasso c. 3 mm. longo. *Semen* subglobosum, c. 2 mm. longum, pallide brunneum, verrucosum.

Type: *L. C. Leach & R. D. A. Bayliss* 11796 (BM: BRLU: COI: G: K: LISC: LMJ: MO: PRE: SRGH, holotype).

MOZAMBIQUE. Sol do Save: c. 15 km. N of Manjacaze, "mata de M'crusse de Santos Gil", fr. 3. xii. 1942, *F. A. Mendonça* 1576 (LISC); Ponta Zavora, 24° 31′ S, 35° 12′ E, in heavy shade of evergreen scrub on coastal sand dunes, fl. & fr. 3. x. 1963, *L. C. Leach & R. D. A. Bayliss* 11796 (BM: BRLU: COI: G: K: LISC: LMJ: MO: PRE: SRGH); Miramar, ± 15 miles NE of Inhambane, on sand dunes in shade of coastal scrub, fl. & fr. 4. x. 1963, *L. C. Leach & R. D. A. Bayliss* 11798 (BM: BRLU: COI: G: K: LISC: MO: PRE: SRGH); ibid., complete juvenile plants (G: K: LISC: PRE: SRGH).

E. baylissii is a shade-loving plant of the coastal sand dunes of the Sol do Save region of Moçambique; the distribution, as at present known, lying between Inhambane and Manjacaze. Plants are found only on the white sand dunes and in the heavy shade of evergreen scrub; the plant from Manjacaze, although with its habitat some little distance from the coast, enjoys virtually identical conditions inasmuch as the "mata de M'crusse de Santos Gil" has "soil (recent white sands) and an ecology akin to those of the littoral dunes" while "M'crusse is the vernacular name of *Androstachys johnsonii* Prain, an evergreen gregarious tree living in patches of closed and shadowy forest never far from the sea".

The new species appears to have a very extended flowering period; plants collected when in bud and in fruit (frequently at all stages on the same plant) in October 1963 and placed in cultivation at Nelspruit, Transvaal and at Salisbury, S. Rhodesia were still flowering in March 1964.

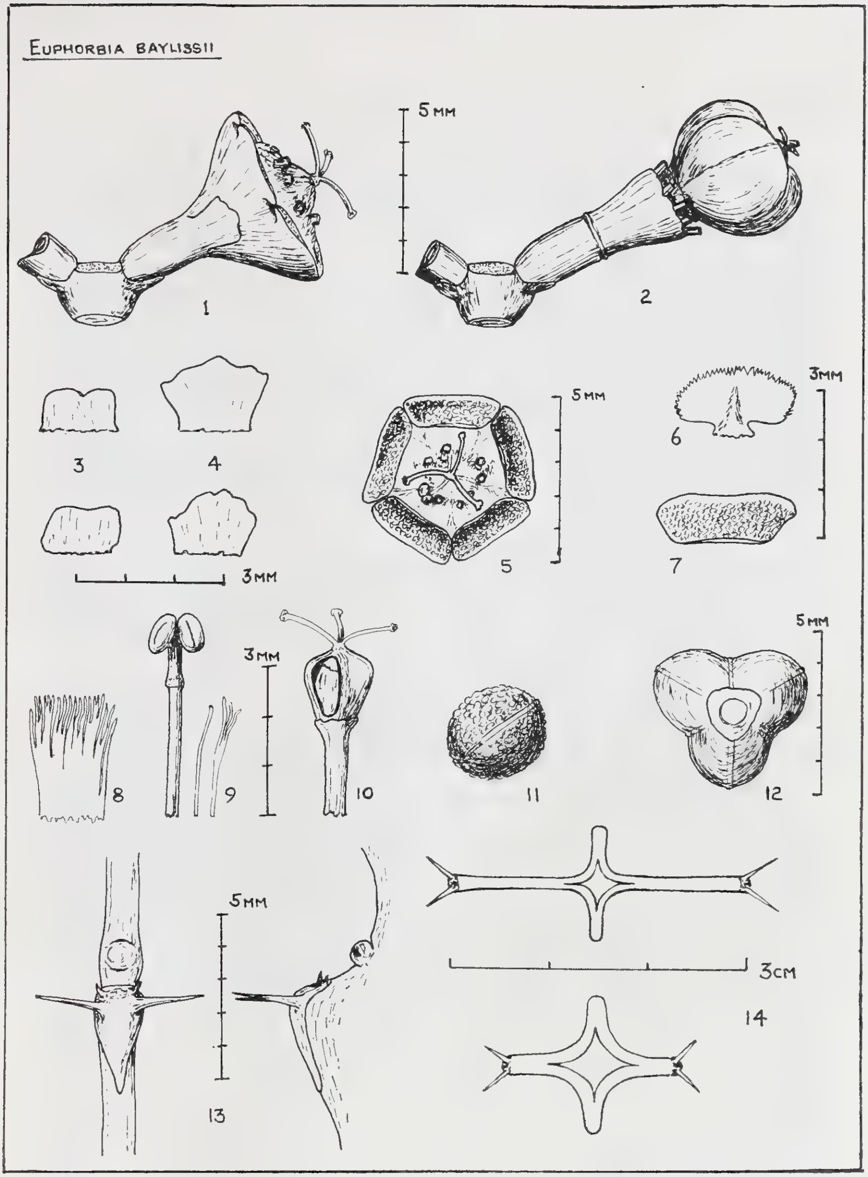


FIG. 2. *E. baylissii* Leach

(1)	Lateral cyathium.	(8)	Internal fascicular bract.
(2)	Lateral cyathium with capsule.	(9)	Staminate flower with bracteoles.
(3)	Peduncular bracts.	(10)	Ovary.
(4)	Involucral bracts.	(11)	Seed.
(5)	Involucre.	(12)	Capsule.
(6)	Involucral lobe.	(13)	Spines and spine shield.
(7)	Gland.	(14)	Sections of stem and branch.

It is with great pleasure that this species is named after Col. R. D. A. Bayliss who has collected widely in E and Southern Africa and who found the Ponta Zavora plants whilst on a collecting trip in the Sol do Save region of Mocambique.

E. baylissii is most closely related to *E. ambroseae*, (which also inhabits the coastal plain of Moçambique about 200 miles to the North) but is a smaller plant, very seldom exceeding 1 m. in height, often reduced to a single unbranched stem and is readily distinguished by its armed obovate spine shields which are scarcely or not at all decurrent and by its winged and toothed angles which are very different from those of the practically unarmed *E. ambroseae;* there are also affinities with the numerous group of closely related shrubs which includes such species as *E. quadrangularis* Pax, *E. lydenburgensis* Schweickerdt & Letty, *E. complexa* R. A. Dyer and the dwarf *E. schinzii* Pax, all of which have important characters in common.

Plant an erect succulent spiny shrub, ·8 m. (exceptionally up to 1·8 m.) high, usually single stemmed, sparingly branched and very sparingly rebranched above. *Stems* and *branches* constricted at intervals (usually distant) with 4 prominently sinuate toothed wing-like angles and a very small central core, usually very distinctly marked with dark green towards the margins with the longitudinal "stripe" almost white; wings up to 1·2 cm. wide excluding the teeth, c. 1 mm. or less thick (the wings sometimes becoming obsolescent and the stem subterete sublignose towards the base, up to 2·25 cm. diam.); teeth ± deltoid or with the upper slope truncate, up to 4·5 mm. high, 8—17 mm. apart along the angles. *Branches* and *branchlets* horizontally spreading or ascending, produced from the constrictions or from the margins of the wings very shortly above the constrictions, generally c. 1·5 cm. diam. *Spine shields* at the apex of the teeth, obovate, acute below but not at all or only very slightly decurrent, pale brown, armed with a pair of spreading diverging needle-like brown spines, 1·5—4·5 mm. long with a pair of minute prickles on either side of the inconspicuous leaf scar. *Leaves* sessile, minute, very soon deciduous, ovate acute, up to 1·5 mm. long. *Inflorescence* an axillary, subsessile or very shortly pedunculate cyme of 3 cyathia arranged in a plane at right angles to the axis of the branch, produced from the flowering eye in the axils of the teeth, 1—3·5 mm. above the spine shields; the central primary cyathium usually male deciduous, sometimes bisexual; the lateral cyathia borne on widely diverging cyme branches, are always bisexual. *Peduncle* bibracteate, c. 1·5 mm. long, 2 mm. thick; bracts transversely broadly oblong, obtuse or truncate, emarginate or subentire; cyme branches 2·5—3 mm. long, c. 1·5 mm. diam.; bracts subquadrate obtuse, obscurely crenulate or subentire. *Involucre* very shallowly funnel shaped, 5·5—6 mm. diam. c. 2·5 mm. long, glabrous, pale creamy yellow flushed purple;

glands 5, transversely oblong, c. 3 mm. wide, 1 mm. long, spreading, very closely contiguous, shallowly concave with the inner margin slightly raised, minutely rugulose, the slightly thickened outer margin smooth and somewhat translucent; lobes 5, overlapping, transversely elliptic, c. 2·5 mm. wide, irregularly denticulate with a slightly fleshy keel, white flushed pink. *Staminate flowers* each with a fimbriate bracteole, arranged in 5 bracteate fascicles each of 3 flowers; bracts oblong fimbriate lacerate, c. 2·5 mm. long. *Pistillate flower* glabrous, ovary raised on a short stout pedicel with a rudimentary obtusely triangular perianth very soon partially exserted from the involucre, obtusely trigonous with the sutures and angles clearly marked, rose pink at the apex; styles free to the base, spreading, c. 1·25 mm. long, pale terracotta, with slightly thickened subcapitate rugulose bright terracotta tips; ovule filling the cell under a minute hood. *Capsule* 3-lobed, 3·5—4 mm. long, 4·5—5·5 mm. diam., very shortly exserted from the involucre on a pedicel 2·5—3 mm. long, dark purplish red at the apex and down the sutures and angles. *Seed* subglobose c. 2 mm. long, pale brown, more or less densely covered with pale coloured verrucae, suture raised with a narrow dark brown line on either side.

ACKNOWLEDGEMENTS

The author wishes to acknowledge his indebtedness to:

Col. R. D. A. Bayliss for much assistance on various botanical trips in E and Southern Africa and particularly on the expedition when *E. baylissii* was collected, for living plants and photographs from various localities.

Dr. L. E. Codd and his staff for the facilities of the National Herbarium, Pretoria, and for much help on many occasions.

The Director, Centro de Botânica, Lisbon, for sending *Euphorbia* material to Salisbury and to Drs. F. A. Mendonça and E. J. Mendes of that Institution for the information concerning the Manjacaze habitat of *E. baylissii.*

Dr. H. Wild and the staff of the Government Herbarium, Salisbury, for the facilities of the Herbarium and valuable assistance generally.

BOOK REVIEW

THE BIOLOGY OF THE TRACE ELEMENTS: Their role in nutrition. By Karl H. Schütte. XX plus 228 pages with 74 figures and 54 tables. London: Crosby Lockwood and Son Ltd., 1964, 40/-.

This book is the first of a series of international monographs on various aspects of animal and human nutrition which is being brought out under the distinguished editorship of Dr. Andre Voisin. These monographs are all being prepared by acknowledged specialists in their respective fields, so that the choice of his book to head this important series clearly indicates the high reputation which Dr. Schütte, of the Botany Department, University of Cape Town, has established for himself overseas in this, his chosen field.

For a plant or animal to be healthy *balanced* nutrition is of the utmost importance. This means that, if it is to grow and develop normally, any organism must be able to obtain adequate supplies of all the elements essential to its life from its immediate environment. Furthermore, such essential elements must be available in suitably balanced proportions, since an excess or deficiency of one or more essential elements may well have markedly adverse effects on its development. Unfortunately, most nutritional studies in the past have been mainly concerned with the correct balancing of the major elements in the fertiliser or the diet, with the consequence that it is only within the last few years that it has begun to be generally appreciated that trace element *imbalances* can be equally disastrous.

In the long run all animals are dependent on plants for their nutrition, whilst, apart from the limited amount of mineral elements supplied by man as agricultural fertilisers, plants themselves obtain their supplies of essential mineral elements from the soil. This ultimate dependence of all terrestrial life on the soil as the source of its trace element requirements at once raises the question as to how far the different soil regions of the earth are capable of providing all that is needed to support healthy crops. This question can only be answered by means of a global survey of trace element availability; a project which, unfortunately, is still in its infancy. However, such information as is at present recorded shows that conditions of trace element imbalance, mainly cases of deficiency of one or more elements, are widespread throughout all the continents. In fact it is becoming more and more evident that trace element deficiencies now play a major role in limiting growth and yields in many important agricultural regions.

Thus, mainly due to the work of Dr. Schütte and others, we know now that various trace element deficiencies are of general occurrence throughout the whole of Africa south of the Sahara. However, due to the paucity of research institutes in this area, it is probably true to say that no detailed local knowledge of the distribution of these deficiencies is, as yet, available for any region other than the Western Cape.

That such local knowledge is of the greatest practical importance to farmers and growers is unequivocally demonstrated by the present extremely flourishing condition of the Western Cape fruit and wine industries. Here many of the finest orchards and vineyards are situated on land deficient in manganese, zinc or copper, or, in the worst cases, deficient in all three elements. However, since these nutrient imbalances are now thoroughly understood, they are easily remedied by the inclusion of regular applications of the deficient elements during the course of the ordinary annual spray programmes.

Many other cases of serious nutrient imbalances in respect of agricultural crops, livestock and humans, together with the various methods employed for their diagnosis and treatment, are reported by the author from all the five continents. His account of this important subject is written in an easily readable manner with as few technicalities as possible, so that the book should prove of the greatest interest to anyone evenly remotely interested in any respect of nutrition, whether he be doctor, veterinarian, biologist, farmer or only a consumer of foodstuffs.

For the specialist much valuable and hitherto unavailable information is given in the many tables and diagrams. There is also an excellent bibliography which is especially valuable to the English speaking worker, since it includes numerous references to many, often little known, foreign language publications.

The index is extensive, running to some 14 pages, and greatly adds to the usefulness of the book. The publishers are to be congratulated on the care taken in its compilation, since, only too often, many otherwise valuable publications are rendered practically useless due to inadequate indexing.

As is apparently always the case in a first edition the usual few errors have slipped in. Thus, the two photographs forming Fig. 33 on page 83 have been transposed, whilst, under Reference No. 57, Butler and Jones' classic textbook should, of course, be entitled *Plant Pathology*. These matters will, no doubt, soon be put right in the second edition, which would appear to be almost inevitable in view of the fact that both an American and a German edition are now in active preparation.

The paper and printing are both of a very high standard and the price is reasonable; the book can therefore be strongly recommended without reservation.

G. B. PORTSMOUTH.

A NEW ALOE SPECIES AND VARIETY FROM SOMALIA NORTH

G. W. Reynolds

(With Plates XXVIII-XXX)

Aloe hemmingii Reynolds et Bally. Species nova, affinis *A. jucunda* Reynolds, sed haec planta grandiore non caespitosa, foliis grandioribus maculis dissimilibus, inflorescentia altiora, differt.

Planta succulenta, acaulis vel brevissime caulescens. *Folia* c. 10, dense rosulata, patula vel brevissime recurvula, lanceolata, vel ovato-lanceolata, c. 10—12 cm. longa, 3—3·5 cm. lata; *supra* basi plana, superne levissime canaliculata, copiose maculata; *subtus* convexa copiose maculata; marginibus dentibus deltoideis brunneis 2 mm. longis 4—6 mm. distantibus armata.

Inflorescentia simplex saepe 30 cm. longa. *Racemus* cylindricus, 10—15 cm. longus laxe c. 18-floribus. *Bracteae* ovato-acuminatae, scariosae, 8 mm. longae, 3 mm. latae, 3—5-nervatae. *Pedicelli* 6—8 mm. longi. *Perianthium* cylindraceo-trigonum, roseum, 24 mm. longum, circa ovarium 8 mm. diam; *segmenta exteriora* per 7 mm. libera; *interiora* latiora. *Antherae* 2—3 mm. exsertae. *Stigma* demum 3—4 mm. exsertum. *Ovarium* viridulum, 5 mm. longum, 2 mm. diam.

Somalia North. Sheikh Pass, Golis Range, 1 June 1949, Bally 7146 holotype (EA); near Sheikh Pass, coll. Bally, B7146, cult Johannesburg, fl. 19 Feb. 1955, Reynolds 7207 (PRE); *Borama Dist.* Loli Mudeda, 8 miles N.W. of Borama, 3 Oct. 1954, Bally B9961 (EA).

Our distinctive new species is named after Mr. C. F. Hemming, who for many years travelled extensively with the Desert Locust Survey throughout Somalia North (formerly Somaliland Protectorate), Somalia South, Northern Kenya, parts of Ethiopia, and S. Arabia. He collected extensively in remote places, including many plants of Aloe, and I am indebted to him for plants and much assistance.

Mr. P. R. O. Bally collected plants of *A. hemmingii* in May 1949 near the top of Sheikh Pass in the Golis Range, south of Berbera, (B.7146), and in October 1954 he found the same species flowering at Loli Mudeda, 8 miles N.W. of Borama, which is about 84 miles west of Hargeisa.

A. hemmingii is nearest allied to *A. jucunda* Reynolds (see this *Journal* 19: 21 (1953)) but the latter is a much smaller plant that suckers freely and forms

dense groups; it has much smaller leaves with different markings, and slightly smaller flowers.

The flowers of *A. hemmingii* have broad whitish borders to the outer segments which give them a somewhat white-striped effect.

DESCRIPTION

Plant succulent, solitary or in small groups, acaulescent or with very short stem.

Leaves about 10, densely rosulate, spreading to slightly recurved near apex, ovate or lanceolate-attenuate, 10—12 cm. long, 3—3·5 cm. broad near base; *upper surface* flat near base, slightly canaliculate and with margins somewhat involute near apex, brownish-green with numerous dull white elongated streaks, throughout; *lower surface* convex, similar in colour to upper surface, but with the white lenticular streaks or blotches smaller and more numerous throughout; *margins* armed with pungent deltoid teeth that are whitish near base, brown-tipped at apex, smaller near base and apex, largest at middle of leaf where they average 2 mm. long, 4—6 mm. apart, sometimes with a few small teeth dorsally in median line near apex.

Inflorescence simple, averaging 30—35 cm. long.

Peduncle slender, basally plano-convex and 5 mm. broad, upwards terete and 3·5 mm. thick, dull brownish, with a few sterile-bracts.

Raceme cylindric, 10—15 cm. long, 5 cm. diam laxly about 18-flowered, the buds grey-green tipped and suberect, open flowers rose-red, nutant to pendulous.

Bracts ovate-acuminate, 8 mm. long, 3 mm. broad, thin, scarious, 5-nerved.

Pedicels 6—8 mm. long.

Perianth flamingo-pink or pale rose-red, minutely spotted, cylindric-trigonous, 24 mm. long, 8 mm. diam across the ovary, thence cylindric-trigonous upwards; *outer segments* free for 7 mm., 3-nerved to base, and with broad white borders giving the perianth a white-striped effect, the apices subacute, slightly spreading; *inner segments* broader than the outer and with broader white border, and broader more obtuse more spreading apices.

Filaments pale lemon, filiform-flattened, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exserted 2—3 mm.

Stigma at length exserted 3—4 mm. *Ovary* yellowish-olive, 5 mm. long, 2 mm. diam.

A NEW VARIETY

A. somaliensis Watson var. **marmorata** Reynolds et Bally. Var. nov., a forma typica foliis grandioribus viridioribus marmoratis, inflorescentia multo ramosiora, racemis brevioribus densiore floreatis, differt.

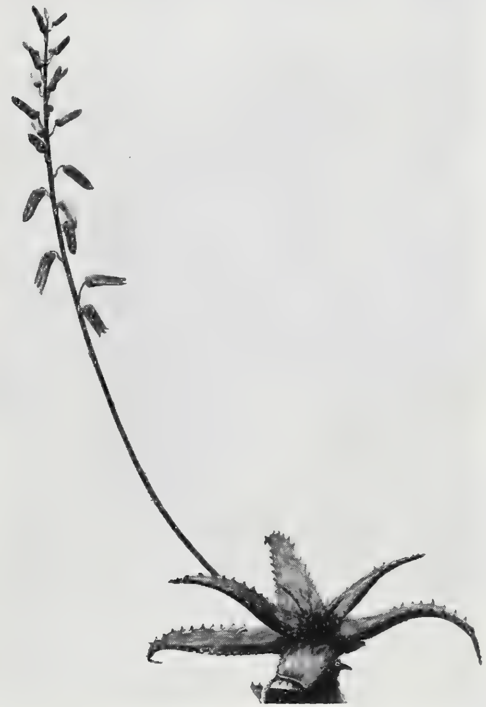


Plate XXVIII

Aloe hemmingii Reynolds et Bally. Cultivated plant from Sheikh Pass, Golis Range, S. of Berbera, Somalia North. Height 40 cm.

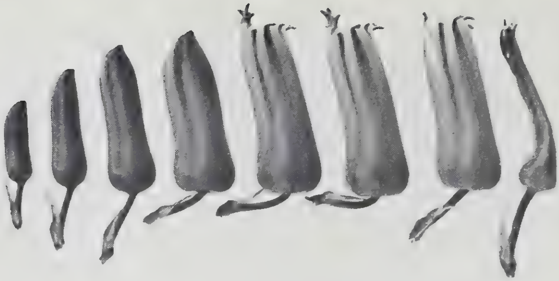


Fig. 1.

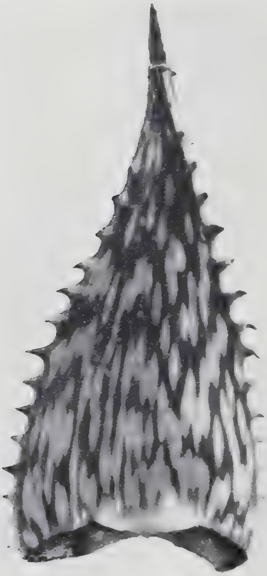


Fig. 2.

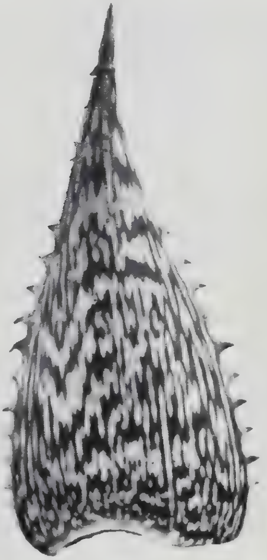


Fig. 3.

Plate XXIX. *Aloe hemmingii* Reynolds et Bally

Fig. 1. Flowers 1/1 from bud to post-pollination stage.

Fig. 2. Upper surface of leaf (natural size).

Fig. 3. Lower surface of leaf (natural size).

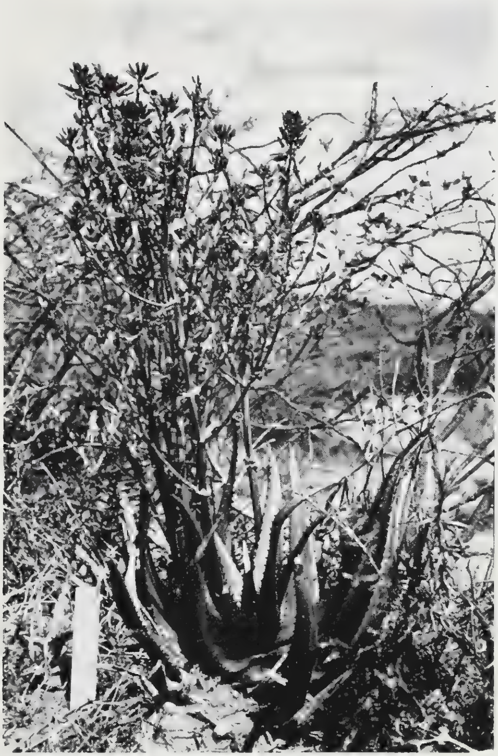


PLATE XXX.

Aloe somaliensis Watson var. *marmorata* Reynolds et Bally

At Upper Sheikh, Somalia North; height 85 cm. The inflorescence entangled in branches of *Acacia etbaica*.
Photo: Mr. P. O. R. Bally.

Somalia North. Near Upper Sheikh, mostly in shade of *Acacia etbaica*, fl. 7 October 1958, P. R. O. Bally 11793, holotype (K), isotypes (EA, PRE, G).

Upper Sheikh, cult. Mbabane, Swaziland, fl. 21 June 1964, Reynolds 8353 (K, PRE).

This interesting variety of *A. somaliensis* was found by Mr. P. R. O. Bally on the flat alluvial plain in the neighbourhood of Upper Sheikh—which is south of Berbera (on the Gulf of Aden) on the road to Burao—locally common, mostly under spreading low-growing bushes of *Acacia etbaica*. In this habitat, the inflorescences become entangled in the branches and photographs give poor detail. I have also collected it myself near Sheikh.

The var. *marmorata* is a larger plant than *A. somaliensis* and has darker green leaves with a different pattern of markings which with age, give the leaves a marbled effect. The inflorescence is considerably more branched, the racemes are shorter and denser flowered, the flowers are deeper red (not pinkish) while the free segments turn ivory-white at maturity.

DESCRIPTION

Plant succulent, acaulescent or with very short stem, solitary or in small groups of 3—4.

Leaves about 16—20, densely rosulate, ascending, spreading near apex, narrowly lanceolate-attenuate, up to 40 cm. long, 6—8 cm. broad. *Upper surface* scarcely canaliculate, dark green, obscurely speckled, with diffuse darker green longitudinal markings giving the leaf a marbled effect; *lower surface* rounded, otherwise as in the upper surface; *margins* armed with brown deltoid teeth 4 mm. long, 4—6 mm. apart low down, 10 mm. apart higher up.

Inflorescence a many-branched panicle, up to 85 cm. high, up to 4 produced simultaneously. *Peduncle* dark-olive green with pale gray longitudinal striations, basally flattened and 20 mm. broad, up to 16-branched from low down, the lowest sometimes with 1—4 secondary branchlets.

Racemes 4—6 cm. long, rather densely flowered, the buds pink, with olive tips, open flowers bright red, the segments turning ivory-white with age.

Bracts triangular, 6—7 mm. long, 3—4 mm. broad at base, 3—5-nerved.

Pedicels 10 mm. long.

Perianth bright red, cylindric, 26 mm. long; *outer segments* free to the middle.

Genitals shortly exserted.

ACKNOWLEDGMENTS

I am deeply indebted to:

Mr. P. R. O. Bally, at that time botanist at the Coryndon Museum, Nairobi, for considerable assistance with the Aloes of Somalia North, for photographs, and copious notes.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, for photographs and the facilities of the National Herbarium, Pretoria.

The South African Council for Scientific and Industrial Research for travelling grants that have enabled me to investigate the Aloes of Somalia North, and elsewhere in Africa.

A NEW ALOE FROM S-W. ARABIA

G. W. REYNOLDS

(With Plates XXXI & XXXII)

Aloe lavranosii Reynolds. Species nova, affinis *A. massawanae* Reynolds, sed foliis brevioribus et rigidioribus, inflorescentia breviori et plus ramosa differt; affinisque *A. breviscapae* Reynolds, sed foliorum marginibus valide dentatis, inflorescentia altiore, pedicellis brevioribus discedit.

Planta succulenta, acaulescens vel caulibus usque 15 cm. longis. *Folia* 10—14, dense rosulata, deltoideo-acuta, carnosa, patentia, apice leviter recurvula, 28 cm. longa, 7·5 cm. lata, 15 mm. crassa, rigida; *supra* viridula, basi plana, superne late canaliculata; *subtus* convexa; marginibus dentibus deltoideis pungentibus 3 mm. longis, 6—12 mm. distantibus armata.

Inflorescentiae saepe 2, 4—9-ramosae, c. 60 cm. altae. *Racemi* cylindraceo-acuminati, sublaxe florentes, 15—20 cm. longi, 5 cm. diam. *Bracteae* ovato-acutae, 8 mm. longae, 3 mm. latae, albidae, scariosae, 7-nervatae. *Perianthium* luteum, glabrum, cylindrico-trigonum, 30 mm. longum, basi obtusum, circa ovarium 7 mm. diam., hinc levissime constrictum; *segmenta exteriora* per 10 mm. libera, 3-nervata. *Antherae* 1—2 mm. exsertae. *Stigma* demum 2 mm. exsertum. *Ovarium* viridulum, 7 mm. longum, 2·5 mm. diametro.

Habitat. South Arabian Federation, Amiri highlands, approx. 2 miles north of Dhala, c. 13° 43′ N., 44° 45′ E., fl. 25 August 1962, Lavranos 1890 holotype (PRE), isotype (K).

During his extensive travels in the South Arabian Federation in 1962 and 1964 investigating the Aloes, Euphorbiae, Stapelieae etc., Mr. John Lavranos found at least five new species of Aloe, one of which I have much pleasure in naming after him. The others will be described shortly.

Numbers of plants were found on a low rocky basalt hill on the Amiri highlands about 2 miles north of Dhala, which is about 87 miles north of Aden, at an altitude of approximately 4,500 ft., and in an area receiving about 15 ins. of rainfall annually.

A. lavranosii with its bright yellow flowers is a strikingly attractive species, and belongs to a group of Aloes characterized by having racemes about 15—20 cm. long, short pedicels 5—10 mm. long, and perianths averaging 30 mm. long, with outer segments connate to beyond the middle. It is not closely allied to any species hitherto described, but shows some affinities with *A. massawana* Reynolds and *A. breviscapa* Reynolds, both from the African mainland.

A. massawana differs in having longer, broader, less rigid leaves, and an inflorescence that is only 3—4-branched and twice as high, with perianths that are pale scarlet and somewhat white-striped. *A. breviscapa* is separated from *A. lavranosii* by having larger leaves, an inflorescence that is only slightly higher than the apices of the leaves, longer laxer racemes, and longer pedicels.

DESCRIPTION.

Plant succulent, acaulescent, or with short decumbent stems up to 15 cm. long, rarely solitary, usually in groups of 5—8 rosettes.

Leaves 10—14, densely rosulate, obliquely ascending-spreading, deltoid-acute, somewhat falcate, with apices slightly recurved, 28 cm. long, 7·5 cm. broad at base, 15 mm. thick, very stiff and rigid; *upper surface* uniformly olive-green with brownish tinge, flat near base, broadly canaliculate upwards; *lower surface* convex, otherwise as in the upper surface; *margins* horny, continuous, pinkish-brown, armed with pungent deltoid brownish teeth 3 mm. long, 6—12 mm. apart, more crowded low down, the apex acute and armed with 2—4 small sharp teeth.

Inflorescence usually 2 from a rosette successively, ascending to suberect, 60 cm. high, 4—9-branched.

Peduncle basally plano-convex and 12 mm. broad, biconvex upwards, brown, the base of lateral branches enveloped by 2 sterile-bracts, one above and one below; *sterile bracts* broadly deltoid, acute, papery, whitish, many-nerved.

Racemes cylindric-acuminate, sublaxly flowered, the terminal 16—20 cm. long, the lateral a little shorter, about 5 cm. diam., youngest buds suberect, older buds spreading, open flowers pendulous.

Bracts ovate-lanceolate, acute, 8 mm. long, 3 mm. broad at base, thin, scarious, whitish, 7-nerved.

Pedicels yellowish-green, 8 mm. long.

Perianth bright yellow, smooth, (without indumentum) cylindric-trigonous, 30 mm. long, basally obtuse, 7 mm. diam. across the ovary, very slightly constricted above the ovary, thence trigonous and slightly compressed laterally, the mouth open; *outer segments* free for 10 mm., 3-nerved, the nerves brownish becoming greenish and confluent at apex, the apices subacute slightly spreading; *inner segments* free but dorsally adnate to the outer for 20 mm., broader than the outer, with 3 crowded bright yellow nerves forming a keel becoming greenish near apex, the broad margins white, the apices more obtuse than the outer.

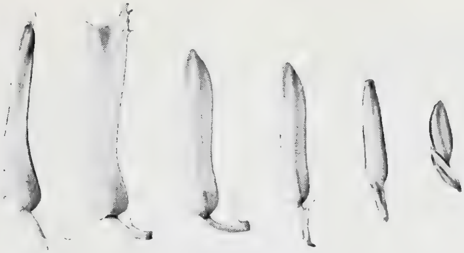


FIG. 1.

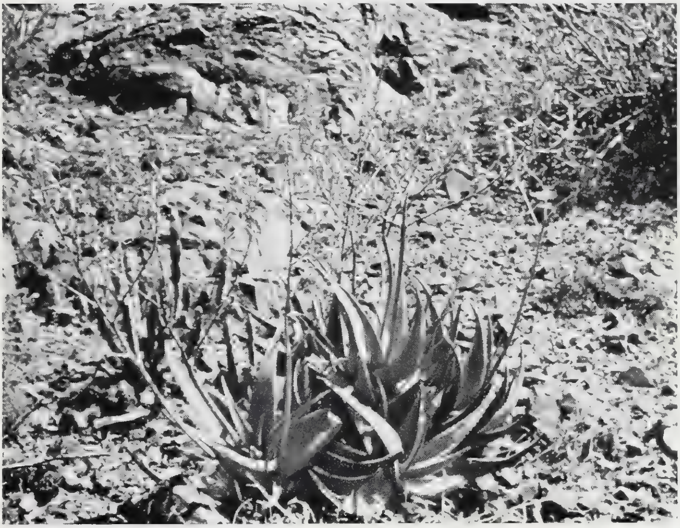


FIG. 2.

PLATE XXXI. *Aloe lavranosii* Reynolds

FIG. 1. Flowers 1/1, from bud to post-pollination stage.
FIG. 2. Plants in natural habitat, 2 miles north of Dhala, Aden Protectorate, Height 70 cm. Flowering in August 1962. *Photos: Mr. J. Lavranos.*

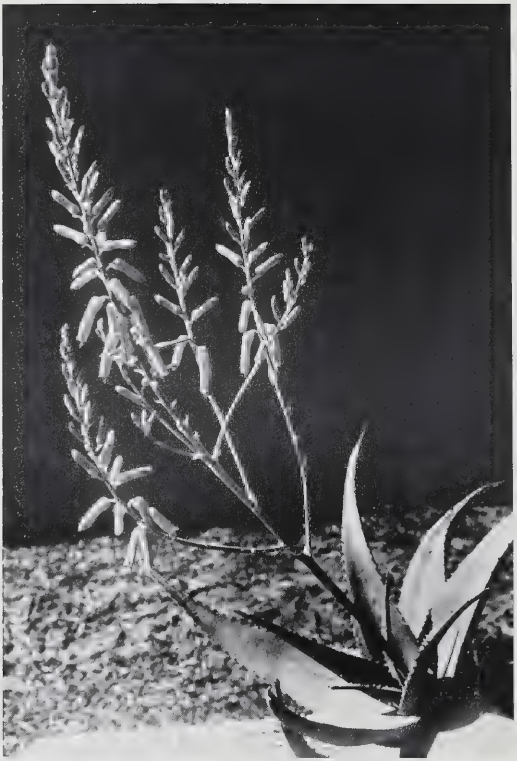


Plate XXXII

Aloe lavranosii Reynolds.

Young plant cultivated in Johannesburg, flowering April 1964. Height 60 cm. *Photo: Mr. J. Lavranos*

Filaments pale yellow filiform-flattened, the 3 inner narrower and lengthening before the 3 outer with their *anthers* in turn exserted 1—2 mm.

Stigma at length exserted 2 mm.

Ovary bright green, 7 mm. long, 2·5 mm. diam.

ACKNOWLEDGMENTS

I am greatly indebted to:

Mr. J. Lavranos of Johannesburg for plants, material, photographs, copious field notes and considerable assistance with the Aloes of Arabia in general.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, for photographs, and for the facilities of the National Herbarium Pretoria.

The S.A. Council for Scientific and Industrial Research for travelling and other grants that have enabled me to investigate the Aloes of Africa.

A NEW ALOE FROM TANGANYIKA

G. W. Reynolds

(With Plate XXXIII)

Aloe greenwayi Reynolds. Species nova, affinis *A. morogoroensis* Christian, foliis longioribus et latioribus, dentibus brevioribus, bracteis majoribus differt.

Planta acaulescens vel caulibus usque 30 cm. longis. *Folia* rosulata, c. 16, usque 30 cm. longa, 6 cm. lata, patula; *supra* viridula, plana vel leviter canaliculata; *subtus* viridia, copiose maculata, maculis parvis albidis; marginibus dentibus pungentibus deltoideis 2 mm. longis, 5—8 mm. distantibus armata.

Inflorescentia saepe 60 cm. alta, 2—3-ramosa. *Racemi* cylindrico-conici, 10—20 cm. longi, 6 cm. diametro. *Bracteae* ovato-acutae, usque 10 mm. longae, 5 mm. latae, scariosae, albidae, 7—9-nervatae. *Pedicelli* 8—10 mm. longi. *Perianthium* cylindrico-trigonum, luteum vel rubro-aurantiacum, 30 mm. longum, supra ovarium 5—6 mm. diametro; *segmenta exteriora* per 10 mm. libera, obscure 3-nervatae. *Antherae* 1—2 mm. exsertae. *Stigma* demum 3 mm. exsertum.

Tanganyika. Tanga Province, Western Usambaras, Kifungilo, 12 miles east of Lushoto, 5,300 feet, fl. 2 July 1958, Reynolds 8759 (holotype PRE, isotypes K, EA); Coll. Kifungilo, Western Usambaras, cult. Hort. Moreau, Amani, 7 April 1942, Greenway 6452 (EA); Coll. Worlds View, Shume, cult. Hort. Greenway, Amani, 25 Nov. 1946, Greenway 7892 (EA).

Our new species is named after Dr. P. J. Greenway who was formerly Botanist at the East African Agriculture Research Institute, Amani, Tanganyika, and latterly Botanist in Charge of the East African Herbarium, Nairobi, Kenya, who has contributed very considerably to the advancement of botanical knowledge of East Africa.

A. greenwayi appears to be nearest allied to *A. morogoroensis* Christian from which it differs in being a larger plant with a stem up to 50 cm. long (longer when hanging down cliff faces), and in having larger more spreading leaves forming open rosettes, shorter more crowded marginal teeth, much larger bracts, and a taller inflorescence.

A. greenwayi grows in numbers on cliff edges of the south-eastern face of the Western Usambaras, and is also found at Worlds View near Shume, at Kifungilo Mission 12 miles east of Lushoto, at Gare, while a weaker form occurs on rock faces two miles west of Soni on the road down the pass to Mombo.

The leaves of *A. greenwayi* are always flushed with reddish-bronze, while flower colours range from lemon-yellow through primrose-yellow to reddish-orange.

DESCRIPTION

Plants solitary or in small groups, acaulescent or with stem up to 30 cm. long —longer when hanging down rock faces.

Leaves about 16, densely rosulate, up to 30 cm. long, 6 cm. broad, spreading and forming rather open rosettes; *upper surface* flat to slightly canaliculate, dull green flushed reddish-bronze, usually with a few scattered very pale green spots; *lower surface* convex, paler green, copiously spotted throughout with numerous very small pale green elongated spots; *margins* armed with small deltoid pungent teeth about 2 mm. long, 5—8 mm. apart.

Inflorescence about 60 cm. high, mostly 1—2-branched from about the middle.

Racemes cylindric-acuminate, the terminal sometimes 20 cm. long, but usually about 15 cm. long with the lateral a little shorter, 5—6 cm. broad, rather densely flowered.

Bracts ovate-acute to lanceolate-acute, about 10 mm. long, 4—5 mm. broad, thin, scarious, dirty-white, rather brittle, 7—9-nerved.

Pedicels 8—10 mm. long, sometimes 12 mm. after anthesis.

Perianth reddish-orange to yellow, cylindric-trigonous, 30 mm. long, basally obtuse and slightly stipitate, 5—6 mm. diam. across the ovary, thence very slightly narrowed on the underside only, the mouth wide open; *outer segments* free for 10 mm., obscurely 3-nerved, paler at the margins, greenish tipped; *inner segments* broader than the outer and with broad white border, with 3 crowded nerves forming a keel and with more obtuse more spreading apices.

Filaments filiform-flattened, the 3 inner narrower and lengthening before the 3 outer, with their *anthers* in turn exserted 1—2 mm.

Stigma at length exserted 2—3 mm.

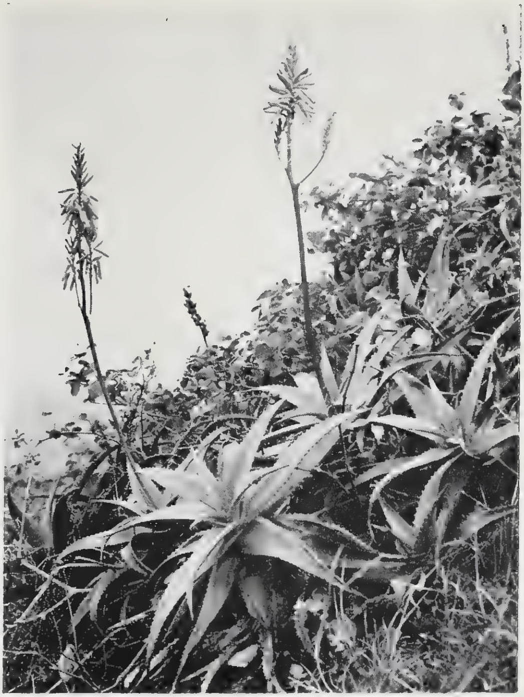
ACKNOWLEDGMENTS

I am greatly indebted to:

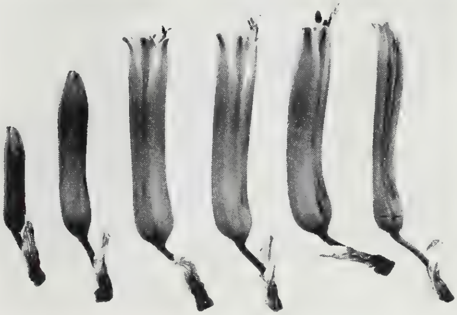
Dr. P. J. Greenway for many plants, much data, and considerable assistance in my investigations of the Aloes of East Africa.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, for photographs and the facilities of the National Herbarium, Pretoria.

The S.A. Council for Scientific and Industrial Research for travelling and other grants which have enabled me to investigate the Aloes throughout Africa.



Plants at Kifungilo, 12 miles east of Lushoto, Western Usambaras, Tanganyika, 5,300 feet, fl. 2 July 1958. Height, 80 cm.



Aloe greenwayi Reynolds. Flowers 1/1 from bud to post anthesis stage.

PLATE XXXIII
Aloe greenwayi Reynolds

NOTES ON MESEMBRYANTHEMUM AND ALLIED GENERA

H. M. L. Bolus

Cheiridopsis hallii L. Bol. sp. nov. (*Turgidae*).—Plantae 2 visae, caespitosae, cum floribus 6 cm. altae, ad 7 cm. diam.; rami steriles 4-foliati, internodio incluso, floriferi 2-foliati, basi reliquiis atratis onusta; partes herbaceae subvelutinae ob papillas minutissimas (capillares non visas), sat pallide glauce virides, saturatiore punctatae, punctis crebris parvis inconspicuis; folia apud apicem per 1·7—2·2 cm. divergentia, 3—4 cm. longa cum vagina 1·3—1·8 cm. longa, lamina supra visa e basi angustata, subacuta, lat. visa novella truncata, matura interdum oblique truncata, superne obtuse carinata, lateribus convexulis, inter minime turgidas in sectione; flores 7 visi; pedunculi 2—2·5 cm. longi; bracteae basales, foliis similes, ad 2·5 cm. longae, basi per 1 cm. decurrente; receptaculum semiglobosum vel subobconicum et in pedunculum subtranseuns, 4—6 mm. longum, 6—8 mm. diam.; sepala 5, subaequilonga, 6 mm., vel in flore altero 7—8 mm., longa, basi 2—4 mm. lata, superne leviter angustata, obtusa, omnia ± marginata; petala ca. 5—6-seriata, interiora pauca, acuta vel acuminata, exteriora inferne non, vel leviter, angustata, obtusa vel emarginata, basim versus alba, deinde laete lutea, externe citrina, ad 1·7 cm., vel in flore altero ad 2 cm., longa, ad 1·5 mm. lata; filamenta ca. 4-seriata, diu erecta confertaque, gracillima, inferne alba, superne lutea, ad 8 mm. longa, antheris cum polline primum luteis; ovarium circa marginem concavum, lobis inconspicuis, prope apicem leviter compressis, dorso complanatis, ad 1 mm. elevatis; stigmata 8, gracilia, stamina bene excedentia, 8—10 mm. longa.

South-West Africa: Lorelei Copper Mine, Mart. 1960, *H. Hall* 1918. N.B.G. 224/60. Fl. Jul.—Aug. 1964.

Cheiridopsis ausensis L. Bol. sp. nov. (*Turgida*).—Caespitosa; ramuli steriles 4-foliati, internodio incluso, floriferi 2-foliati; partes herbaceae velutinae ob papillas minutas, in foliis juvenilibus marginibus carinaque minute ciliolatis; folia apud apicem per 2·5—3·5 cm. divergentia, lat. visa superne ampliata, truncata vel oblique truncata, inter minime turgidas in sectione, ad 3·5 cm. longa, 8—10 mm. diam., novella inaequale biloba, lobis 1—6 mm. longis, cavum formantibus qui cum aetatae completum est(?); flos 1 visus; pedunculus

2 cm. longus, parum supra basim bracteatus; bracteae foliis similes, 1·5 cm. longae cum vagina 8 mm. longa; receptaculum fere semiglobosum, a pedunculo distinctum, 6 mm. longum, 1 cm. diam.; sepala 5, obtusa vel intimum subacutum, 7—9 mm. longa, basi 4—7 mm. lata; petala ca. 5-seriata, e infra medium inferne angustata, saepius obtusa, lutea, fere ad 2 mm. lata; filamenta ca. 5-seriata, lutea, ad 6 mm. longa, antheris pollineque primum luteis, demum albis; ovarium ad 1 mm. elevatum; stigmata 13, gracilia, 4—5 mm. longa.

South-West Africa: Aus, *H. Hall.* N.B.G. 423/59. Fl. Oct. 1961.

This species is remarkable in having all the six juvenile pairs of leaves seen bilobed, the excavation between them perhaps being closed up with age so that the mature leaves show no sign of it whatever.

Conophytum brevisectum L. Bol. sp. nov. (*Derenbergia—Cordiformia*).—Rami 2 visi, reliquiis senectissimis onusti, internodiis inclusis, 6—6·5 cm. longi; ramuli floriferi ad 4·5 cm. longi, reliquiis atratis onusti; vaginae persistentes anni prioris inferne pergamentaceae, rugosissimae, superne coriaceae, pallide brunneae, inferne obscure saturatioreque punctatae, punctis sat grandibus; corpuscula lat. visa obovata vel oblonge obovata, glabra levissima, 2·8—3 cm. longa, prope apicem 1·2—1·7 cm. diam. cum fissura 6—10 mm., medio vaginae 8 mm. lato, lobis supra visis obtusis, lat. visis rotundatis, ad 1 cm. longis, basi pustulatis, 5 mm. latis, prope apicem 5—7 mm. diam., parte pellucida inconspicua subquadrata; flores 8 visi; pedunculi ad 1·5 cm. longi, bene supra basim bracteati; bracteae submembranaceae, viride carinatae, obtusae vel subacutae, 3 mm. longae, lobis vaginam aequantibus, sinu lato; receptaculum inclusum, 2 mm. longum, 3 mm. diam.; calyx 1 cm. longus, tubo tenuiter herbaceo, obscure 5—6-nervato, segmentis 5—6, obtusis, minute papillatis, brunneo viridibus, omnibus ± marginatis, 1·5—2 mm. longis, in genere inter brevissima (itaque nomen); corolla ad 2 cm. longa, tubo superne leviter ampliato, pallido, 1 cm. longo, segmentis ca. 3-seriatis, aureis, obtusis vel subtruncatis, 5—10 mm. longis, ad 1·75 mm. latis; filamenta ca. 8-seriata, alba vel suprema aurea adque per 3 mm. exserta, antheris pollineque luteis; discus obscure crenulatus; ovarium conice per 0·5 mm. elevatum; stylus gracillimus, 4—5 mm. longus; stigmata 5—6, gracillima, 7—8 mm. longa.

Cape Province: Namaqualand; Nakamas, "15 miles E. of Port Nolloth and S. towards Grootmist", Aug. 1963, *P. van Heerde*. Bolus Herb. 27615. Fl. hort. Maio 1964.

The dots on the resting sheaths of the previous year are unlike any hitherto described, in that they appear to be obscured by a veil.

Conophytum philippi L. Bol. sp. nov. (*Derenbergia—Cordiformia*).—Planta 1 visa, fera senecta, sine floribus 6·5 cm. alta; caulis cum reliquiis 9 mm. diam.;

rami ramulique floriferi reliquiis induratis, atratis, vel brunneo atratis, vestiti; vaginae persistentes anni prioris inferne pergamentaceae, superne coriaceae, interdum corpusculum omnem fere includentes, asperulae, brunneae vel rubre brunneae; corpuscula cordiformia, minute asperula, subglauce viridia, ad 2·4 cm. longa, apice ad 1·5 cm. diam. cum fissura 2—3 mm. longa, vagina convexa ecarinata, lobis supra visis obtusis, lat. visis rotundis ecarinatis, 2—3 mm. longis, parte pellucida obscura; pedunculi 8—10 mm. longi; bracteae per 4 mm. a basi positae, herbaceae, 3 mm. longae, lobis vaginam aequantibus, sinu subrotundato; receptaculum 1·5—2 mm. longum, ad 3 mm. diam.; calyx herbaceus, 7—8 mm. longus, tubo 4—5 mm. longo, segmentis 5, obtusis, minute papillatis, brunneo viridibus, subaequilongis, ad 3 mm. longis, vel 3—4 mm. longis; corolla 1·3—1·8 cm. longa, tubo superne ampliato, albo, 7—9 mm. longo, segmentis 2—3-seriatis, obtusis, parum inaequilongis, luteis, ad 1·25 mm. latis; filamenta ca. 8-seriata, infima longissima, ad 7 mm. longa, alba, superiora per 3 mm. exserta, lutea; discus inconspicuus crenulatus; ovarium levissime elevatum, lobis inconspicuis, stellate patentibus, discum attingentibus; stylus 4—5 mm. longus; stigmata 5—6 mm. longa; capsula obscure 5-angulata, infra obconica, 10-costata, 2·5 mm. longa, 4 mm., expansa 8 mm., diam., suturis vix compressis, rubre brunnea, conspicue saturatiore punctata, medio vix elevato.

Cape Province: Namaqualand; Kleinzee, Mart. 1964, *Philip A. B. van Breda* 2052/64.

Conophytum hians N. E. Br. var. **acuminatum** L. Bol. var. nov.—Corpuscula subpiriformia, superne dense pubescentibus, 1 cm., vel in stipitem angustata, ad 1·5 cm., longa, lobis leviter divergentibus, rotundis, 1·5—2·5 mm. longis, supra visis obtusis; flores 12 visi, meridiani; corolla 6—7 mm. longa, segmentis ca. 3-seriatis, longe acuminatis, basim versus aureis, deinde laete rubris, ad 0·75 mm. latis; stamina pauca, exserta, antheris primum pallide luteis, 1·25 mm. longis; stylus ca. 1 mm. longus; stigmata 4, 6 mm. longa.

Cape Province: Namaqualand; "15 miles S. of Port Nolloth," *H. Hall* 2439. N.B.G. 584/62. Fl. Mart. 1964.

Conophytum hians N. E. Br. was described without flowers in 1927, and it was not until 1938 that a coloured plate with dissections was made by Miss Carter and published in my "Notes" (vol. iii: plate 18 D) depicting a plant collected by Mr. R. Smithers in 1935 at Lekkersing, the type-locality. This may now be regarded as the typical form and the variety described has been compared with it.

Conophytum brevipes L. Bol. sp. nov. (*Euconophytum—Wettsteiniana*).—Planta 1 visa, fera, semiglobosa glabra, 10 cm. diam., medio 7·5 cm. alto; vaginae persistentes anni prioris inferne subcoriaceae rugosae, rubro brunneae, superne supraque tenuiter pergamentaceae, albidae vel pallide brunneae vel griseae, reliquiis senectis in ramis ad 12 visis, superne atratis; corpuscula late obconica, supra circularia vel duo in vagina evoluta ovalia, e margine ad os gradatim leviterque elevata, pallide glauce viridia, punctis sparsis paucis viridibus, oculo nudo vix visis, 1—1·3 cm. longa, ad 1·5 cm. diam., ore inter minima in genere visa, 2—3 mm. longo, vinculo inconspicuo saturatiore cincto, labiis leviter ringentibus, eciliatis; pedunculi inter brevissimos visos, 1·5—2 mm., fructiferi ad 5 mm., longi; bracteae obtusae, receptaculum attingentes, vagina lobos aequans, sinu lato; calyx 1 cm. longus, tubo membranaceo, viride 5-nervato, ad 7 mm. longo, saepius per 2 mm. incluso, segmentis 5, angustis obtusis papillatis, omnibus late marginatis, subaequilongis; corolla 1·5 cm., vel in flore expandente post dies plures in aqua ad 2·1 cm., longa, tubo pallido, saepius 7—8 mm. longo, segmentis ca. 3-seriatis, obtusis, inferne pallidis, superne purpureo roseis, saepius ad 1 mm. latis; stamina ca. 7-seriata, e basi tubi adnata, filamentis superioribus breviter exsertis aureisque, antheris pollineque luteis; ovarium supra in flore expanso non notatum, sed in flore senecto post dies 30, receptaculo adhuc non mutato, obtuse 5-lobatum, lobis leviter elevatis, erectis approximatis, dorso subcomplanatis, discum inconspicuum attingentibus; stylus 4—5 mm. longus; stigmata 5, ad 3 mm. longa; capsulae 5 visae, infra obconicae, 1·5—2 mm. longae, supra fere planae, non, vel inconspicue, angulatae, suturis levissime compressis, brunneae, 3—4 mm., expansae 6—8 mm., diam.

Cape Province: Namaqualand; Anenous Pass, Maio 1964, *H. Hall* 2769. Fl. Maio 1964. N.B.G. 248/64.

Conophytum indutum L. Bol. sp. nov. (*Euconophytum—Wettsteiniana*).—Plantae 5—7 cm. diam.; rami primarii 2—3·4 cm. longi, ad 3 mm. diam., ad basim reliquiis vaginarum onusti; ramuli floriferi 1—1·5 cm. longi; vaginae persistentes anni prioris inferne pergamentaceae glabrae politae brunneae, superne tenuiores, pilis patentibus densis brevibus indutae, apicibus laceratis, saturatiore brunneis; corpuscula piriformia, 6—8 mm. longa, 4—5 mm. diam., apice et dimidio superiore laterum pilis brevibus indutis, supra punctis sparsis, sat conspicuis, saturate viridibus, ornata, ore leviter depresso, glabro, punctis approximatis cincto, 1·5 mm. longo; pedunculi 3 mm. longi; bracteae basales obtusae virides parvae; receptaculum 1·5 mm. longum diametroque; calyx fere omnino membranaceus, 5 mm. longus, segmentis 4, obtusis, 1 mm. longis; corolla roseo purpurea, 1·4 cm. longa, tubo saturatiore segmentis, 8 mm., vel post 2—3 dies ad 1 cm. longo, segmentis ca. 19, ca. 3-seriatis, obtusis vel emarginatis vel acutis, fere ad 1 mm. latis; stamina ca. 4-seriata, infima prope basim adnata, inclusa, seriebus superioribus 2 exsertis, filamentis antherisque purpureis, polline sordide subpurpureo vel luteo; discus inconspicuus, obscure crenulatus; ovarium supra in medio conice leviter elevatum, in stylum 8 mm. longum insensim transeuns; stigmata brevissima, non bene visa.

Cape Province: Namaqualand; 10 miles north of Steinkopf, Jul. 1948, *H. Hall.* Fl. Feb. 1949. N.B.G. 1025/48.

The name is derived from *induere*, "to put on or be dressed with", and refers to the indument of this species, the only pubescent one hitherto recorded in this *Series.*

Conophytum prolongatum L. Bol. sp. nov. (*Euconophytum-Carruicola—Picta*). —Ad **C. framesii** proxime accedit, sed corpusculis elongate piriformibus, longe stipitatis, calycis segmentis 6, tubo aequilongis, ore glabro, 4—6 mm. longo, differt.

Vaginae persistentes subpapyraceae, inferne brunneae vel griseae; corpuscula 4 visa, e vaginis 2 evoluta, elongate piriformia, basi de axe prolongata itaque stipitem 4—5 mm. longum formantia, apice convexissimo, subtranslucente viridia, punctis sparsis, saturate viridibus, 1·5—2 cm. longa, ad 7 mm. lata, ad 1 cm. diam., ore punctis approximatis cincto, in florentibus latera attingente; pedunculi 7—8 mm. longi, bracteis parum infra medium positis, obtusis, vagina lobis parum breviore; receptaculum exsertum, 3 mm. longum diametroque; calyx 5—6 mm. longus, tubo pallido membranaceo, 2·5—3 mm. longo, segmentis 6, subcarnosis obtusis, rubre brunneo glanduliferis, 2—3 mm. longis; corolla straminea, ad 9 mm. longa, tubo 3 mm. longo, segmentis 2—3 -seriatis, acutis vel obtusis, ad 0·75 mm. latis; stamina 20—22, 3-seriata, superiora exserta, antheris ad 1·5 mm. longis, cum polline stramineis; discus e segmentis ca. 10, truncatis compositus; ovarium supra concavum, medio anguste conice vel subcylindraceo ad 0·5 mm. elevato, dimidium altitudinis disci attingente; stylus 1 mm. longus; stigmata 5, 2 mm. longa.

Cape Province: in dit. Vanrhynsdorp; "30 miles N. of Vanrhynsdorp," Jan. 1954, *H. Hall.* Fl. Apr. 1955. N.B.G. 276/54.

C. framesii has been listed in the Series *Ficiformia,*[*] but seems better placed in the *Carruicola* Subseries *Picta* as do also **C. meleagris, C. morganii** and **C. stipitatum.**

Conophytum varians L. Bol. sp. nov. (*Euconophytum—Carruicola—Picta*).—Vaginae persistentes inferne papyraceae pallideque brunneae, superne saturatiores, vel senectae griseae tenuiterque pergamentaceae; corpuscula obovata vel elongate obovata vel fere cylindrica, basi rotunda, minutissime papillata, florentia 6—15 mm. longa, ad 8 mm. lata, ad 10 mm. diam., apicibus saepius ovalibus, variabile interdumque inconspicue pictis, etiam in eadem planta, punctis saturate viridibus, nunc paucis sparsis, nunc contiguis, lineam, interdum

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[*] Jacobsen, Handbook of Succulent Plants iii:1044.

1-ramosam, e medio oris ad marginem formantibus, ore punctis separatis vel contiguis vel in vinculum omnino coalescentibus ornato, ciliato, ciliis supra visis patentibus, 3—5 mm. longo; pedunculus ad 8 mm. longus, bracteis prope basim positis, subcarnosis subacutis, ad 3 mm. longis, vagina lobos aequante, sinu sat angusto; receptaculum 2 mm. longum diametroque; calyx 4—6 mm. longus, tubo ad 3 mm. longo, membranaceo, venis 5, gracillimis rubris, e basi ad apicem segmentorum percurrentibus ornato, dimidio superiore pluribus similibus utrinque onusto, segmentis 4 vel in flore unico 5, obtusis, primum carnosis papillatisque, ad 1·5—2 mm. longis; corolla albida, ad 1 cm. longa, tubo 3—4 mm. longo, segmentis ca. 4-seriatis, exterioribus obtusis vel truncatis, ad 0·75 mm. latis, interioribus acutis vel acuminatis; stamina ad 12, 4-seriata, e basi corollae adnata, superiora breviter exserta, antheris pollineque primum pallide luteis; discus profunde divisus, e segmentis ca. 9, truncatis vel subemarginatis, compositus; ovarium supra concavum, medio subconice elevato, in stylum brevem insensim transeuns; stigmata 4 vel in flore unico 5, vix ad 2 mm. longa.

Cape Province: in dit. Vanrhynsdorp; Komkans, Aug. 1962, *H. Hall* 2547. Fl. Apr. 1964. N.B.G. 724/62.

"These specimens grew in shallow soil over rocks, as were **C. occultum,** but they are larger bodied and about a mile away from them." (*H. Hall.*)

Conophytum saxetanum N.E. Br. forma.—Corpuscula lat. visa obovata vel fere circularia, pallide viridia, 7—14 mm. longa, ad 14 mm. diam., lobis 1·5 mm., vel rarissime ad 2·5 mm., longis; flores primum in vespera expansi, deinde non claudentes; pedunculi 2·5—6 mm. longi; bracteae herbaceae, ad 4 mm. longae, lobis subtruncatis, vaginam acquantibus vel multo brevioribus vel subnullis, sinu lato; calyx herbaceus, 4—5 mm. longus, tubo 2—3 mm. longo, segmentis 4, obtusis aequilongis, omnibus marginatis, exterioribus basi 1·5—2 mm., interioribus ad 1 mm., latis; corolla albida vel rarius pallidissime rosea, 6—7 mm. longa, segmentis 3-seriatis, obtusis vel rotundatis vel paucis intimis acutis; filamenta 2—3-seriata, superne lutea, extima ultra medium segmentorum corollae attingentia, antheris acutis, cum polline aureis; discus e circa 9 segmentis truncatis compositus; ovarium circa marginem concavum, deinde cylindrice elevatum, altitudinem disci attingens, in stylum insensim transeuns; stylus ca. 1 mm. longus; stigmata 5, gracillima, ad 6 mm. longa.

Cape Province: Namaqualand; "12 miles S. of Alexander Bay," *H. Hall* 2148. Fl. Mart. 1964. N.B.G. 993/60.

The type of this species was described in 1909 by its discoverer, R. Marloth, who named it *M. fimbriatum*, a name already used by Sonder for a very different plant. In 1920 N. E. Brown gave *M. saxetanum* as its new name, and a description "made from dried material sent to Kew by Dr. Marloth." In 1922, when the

new combination **Conophytum saxetanum** N. E. Br. was made, this description of the flower was not included, and the author states that "flowers were not seen alive." Nor had Dr. Schwantes seen living flowers up to 1959. Mr. Hall's collection, described above, flowered freely at Kirstenbosch. He drew my attention to the broad corolla-segments (unlike those of other forms he had collected in those parts) and their habit of remaining open day and night after their first expansion in the evening.

Conophytum quaesitum N. E. Br. was described in 1920 without flowers, the type being Pearson's collection (Percy Sladen Memorial Expedition 6123) made in 1911 in Namaqualand on the "Jackals Mountains, near Sendlings Drift", when living specimens were sent to Kew. In 1931 a drawing representing 3 flowerless bodies was published in The Journal of the Cactus and Succulent Society and N. E. Brown wrote: "Although this plant was introduced in 1911 I have never seen its flowers."

The following collections are represented in the Bolus Herbarium: South-West Africa; Namus Kloof, May 1955, *H. Hall.* N.B.G. 529/55. Fl. July 1955. A second collection in the same area made in March 1960, *H. Hall* 1939, flowered in March 1961. N.B.G. 246/60. Cape Province; Namaqualand, Swartpoort, near Sendlings Drift, March 1958, *H. Hall* 1303. N.B.G. 99/58. Fl. March 1959 and April 1964. Senderlingsdrif, *A. L. Geyer.* N.B.G. 594/60. Fl. June 1964. The bodies in this collection are the largest recorded, being up to 3·1 cm. long and 2·5 cm. in diameter when pressed. The flowers are also the largest.

The following notes on the flowers were made from the collections recorded above which flowered at Kirstenbosch.

Pedunculi 5—9 mm. longi; bracteae obtusae vel rotundae, obscure carinatae, herbaceae, 3—6 mm. longae, lobis vagina leviter longioribus; receptaculum inclusum, 2·5 mm. longum, 3—4 mm. diam.; calycis tubus partim inclusus vel exsertus, obscure viride 5-nervatis, 2·5—3 mm. longus, segmentis 5, subcarnosis, crebre rubreque glanduliferis vel papillosis, 1·5—3 mm. longis; corolla albida, 9—12 mm. longa, tubo 3—5 mm. longo, segmentis ca. 3-seriatis, acutis vel obtusis, ad 1 mm. latis; filamenta 3—4-seriata, fere omnia exserta, albi vel citrini vel aurei, antheris pollineque pallide luteis; discus inconspicuus crenulatus; ovarium circa marginem concavum, medio demum per fere 1 mm. elevato; stylus nullus vel brevissimus; stigmata 5, 3—4 mm. longa.

Echinus stayneri L. Bol. sp. nov.—Rami plures visi, reptantes glabri, 15—30 cm. longi, internodiis compressis alatis, novellis roseo purpureis, demum pallidis vel fere albis, 1—3 cm. longis, 1·5—3 mm. diam.; ramuli floriferi erecti, saepius 2—4-foliati, internodio incluso, 2·5—4 cm. longi;

partes herbaceae leves politaeque virides; folia conspicue decurrentia, ad 1 cm. longa cum vagina vera 3—5 mm. longa, medio ad 6 mm. lato, lat. visa superne vix angustata, obtusa, 5—7 mm. diam., marginibus cum carina acuta pellucidis, lateribus leviter convexis; flores solitarii, subsessiles, in vagina bractearum inclusi; bracteae foliis similes, marginibus membranaceis, 5—6 mm. longis; receptaculum subglobosum, ad 5 mm. longum diametroque; sepala 4, acuta, exteriora carinata, omnia ± marginata, subaequilonga, 6 mm., vel in flore altero 7 mm., longa, basi 3—5 mm. lata; petala 23, ca. 5-seriata, interiora pauca, 8—10 mm. longa, 1—2 mm. lata, exteriora e supra medium conspicue angustata, obtusa vel saepius subtruncata, emarginata vel irregulariter denticulata, purpureo rosea, 12—15 mm. longa, 2—3 mm., apud basim saepius 0·5 mm., lata; staminodia conspicua, ad stamina conice collecta appressa eaque bene excedentia, acuta vel obtusa, inferne pallida, superne aurantiaca, ad 8 mm. longa; filamenta ca. 7-seriata, albida vel superne lutea, ad 4 mm. longa, antheris pollineque albidis; discus inconspicuus; ovarii lobi stellate patentes, ad 0·75 mm. elevati; stigmata 4, anguste subulata, intus dense breviterque papillata, ad 4 mm. longa cum cauda 1 mm. longa; capsula matura non visa sed semina immatura longe echinata.

Cape Province: in dit. Ceres; "Sout Pan, Ceres Karoo," *F. J. Stayner*. Karoo Garden 490/61. Fl. May 1964. Fruct. immaturus Jul.—Aug. 1964.

Machairophyllum vanbredai L. Bol. sp. nov.—Ramuli floriferi 6—8-foliati; folia matura diu fere erecta, supra visa e medio superne angustata, acuta vel subacuminata, breviora interdum dimidiata, 3—4·5 cm. longa, medio 1·3—1·7 cm. lato, 1 cm. diam., longiora ad 6 cm. longa cum vagina 1·7 cm. longa, ad 1·2 cm. lata, 8—10 mm., vel rarius ad 1·2 cm., diam., dorso inferne rotundato, superne carinato, basi sat conspicue pustulata, lat. visa non, vel e medio leviter, angustata, saepius oblique truncata, lateribus convexulis; flos expansus unicus visus, nocturnus, solitarius ut etiam alabastra plura capsulaeque anni prioris sunt; pedunculus gradatim in receptaculum transeuns, 1·7 cm., fructiferus senectissimus ad 6 cm., longus, 4 mm. diam.; bracteae basales, acute carinatae, lat. visae oblique acutae, vel altera oblique truncata, 2·5—3 cm. longae cum vagina ad 1·3 cm. longa; receptaculum 6 mm. longum, 1 cm. diam.; sepala 8, 1—1·2 cm. longa, basi 3—7 mm. lata, e prope basim superne angustata, brevissime apiculata, exteriora inconspicue carinata, interiora anguste marginata; petala 6—7-seriata, inferne non, vel vix, angustata, acuta vel acuminata, basim versus alba, deinde laete lutea, externe superne rubra, 8—18 mm. longa, 0·25—0·75 mm. lata; filamenta ca. 7-seriata, inferne alba, superne citrina, ad 1·1 cm. longa, antheris pollineque pallide luteis; nectarium non bene visum, glandulis contiguis (?); ovarium circa marginem concavum, lobis erectis, obtuse compressis, per 2 mm. elevatis; stigmata 8, gracilia viridia, ad 9 mm. longa.

Cape Province: in dit. Somerset East; "on the farm 'Witwater'," *P. A. B. van Breda* 1749/62. Fl. Aug. 1962 et 1964.

Ruschia lokenbergensis L. Bol. sp. nov.—Plantae 2 visae, ferae, erectae rigidae, 13—16 cm. altae, ad 22 cm. diam.; caulis ad 1·5 cm. diam.; rami primarii ad 5 mm., ceteres ad 2 mm., diam., internodiis ad 2·5 cm. longis; partes herbaceae velutinae ob papillas minutas; ortus hornotini florentes e foliis 2 et flore 1 compositi, ramulis senioribus reliquias membranaceas annorum priorum ferentibus; folia ascendentia, demum fere patentia, supra visa plana, ovata vel oblonge ovata vel lineare lanceolata, acuta vel obtusa, lateraliter visa oblonga vel subovata, apice saepius rotundo, lateribus convexulis, carinata, glauce viridia, marginibus carinaque subpellucidis, 5—15 mm. longa, 4—5 mm. lata, 4—6 mm. diam.; flores meridiani, 1·5—1·9 cm. diam.; pedunculi teretes, 5—10 mm., fructiferi ad 14 mm., longi, prope basim bracteati, bracteis ovatis, acute carinatis, marginibus membranaceis, 2—3 mm. longis; receptaculum obconicum, apice tumido, tumoribus 5, infra sepala positis, ad 3 mm. longum, ad 4 mm. diam.; sepala 5, obtusa vel subacuta, 2·5—3 mm., vel in flore altero 3—4 mm., longa, basi 1·5—2·5 mm. lata, interiora late marginata; petala 2—3-seriata, inferne e prope medium leviter angustata, saepissime obtusa, pulchre rosea, ad 8 mm. longa, 0·5—1 mm. lata; staminodia inferne alba, ad stamina conice collecta appressa eaque bene excedentia, superne recurva, roseo purpurea, apice albo, massa prope medium constricta; stamina ca. 4-seriata, ad 4 mm. longa, intima prope medium dense papillata, antheris pollineque luteis; discus conspicuus crenulatus; ovarii lobi obtuse compressi, ca. altitudinem disci attingentes; stigmata 5, subulata, 2 mm. longa; capsulae infra obconicae, tumoribus 5, conspicuis, 2 mm. longae, supra per 2 mm. elevatae, suturis valde compressis, 6 mm., expansae 11 mm., diam., valvis fere patentibus, carinis basi distantibus, superne divergentibus, aristatis, apicem valvae fere attingentibus, tuberculo conspicuo, late spathulato, albido, seminibus obovatis levibus brunneis minutis.

Cape Province: in dit. Calvinia; Lokenberg, "on dry rocky rugged hills with dry 'fynbos', similar to extreme N. Cederberg. Upper Southern slopes on otherwise bare patches," Maio 1964, *E. Esterhuysen* 30699.

Ruschia minutifolia L. Bol. sp. nov. (*Microphyllae*).—Plantae 2 visae, ferae, compactae erectae, vel ramis infimis interdum reptantibus, 7—8 cm. altae, ad 13 cm. diam.; caulis ad 7 mm. diam.; rami primarii ad 4 mm. diam.; ramuli superne cinerei vel albidi, 3—6 cm. longi, ad 3 mm. diam., ultimi floriferi 1—2·5 cm. longi, ortibus hornotinis saepius 6—8 mm. longis, e foliis 4 et bracteis cum flore compositis; folia difformia, inferiora supra visa ovata, demum rubra, ad 3 mm. longa, 2·5 mm. lata, superiora lanceolata, ad 4 mm. longa, 1·5 mm. lata, inter minima in genere, novella inconspicue apiculata, marginibus carinaque ciliolatis; pedunculi 1—2 mm. longi; bracteae basales, 2—3 mm. longae, marginibus membranaceis; receptaculum obconicum, 1·5 mm. longum, ad 3 mm. diam.; sepala 5, acuta vel subacuta, saturate rubra, 2—3 mm. longa, basi 1·5—2 mm. lata; petala ca. 3-seriata, basim versus leviter angustata, obtusa, purpureo rosea, in siccis angustissime vittata, 4—6 mm. longa, 0·5—1 mm. lata; staminodia stamina appressa eaque bene excedentia, basim versus pallida, superne saturate purpurea; filamenta ca. 3-seriata, superne saturate purpurea, ad 2 mm. longa, intima supra medium papillata, antheris pollineque albis; ovarii lobi obtuse compressi, approximati, ad 0·5 mm. elevati; stigmata 5, anguste subulata, atre purpurea, 2 mm. longa; capsula infra obconica, 2 mm. longa, 5 mm., expansa 8 mm., diam., supra saturate glandulifera, ad per 1 mm. elevata, suturis compressis, valvis reflexis, carinis non aristatis, tuberculo conspicuo albido.

Cape Province: in dit. Clanwilliam; Pakhuis Pass, 3,000 ft., "numerous in shallow soil and overhanging rocks," Jul. 1964. *H. Hall* 2829. N.B.G. 408/64.

Ruschia paucifolia L. Bol. sp. nov. (*Microphyllae*).—Plantae 3 visae, ferae, erectae, ad 21 cm. altae, vel in planta breviore ramis inferioribus reptantibus, glabrae; caulis ad 5 mm. diam.; rami primarii 3 mm. diam.; ramuli ultimi floriferi 5—15 mm. longi, saepius 1·5 mm. diam., inferne reliquiis vaginarum annorum priorum, interdum gemmiferis, vestiti, ortibus hornotinis e foliis 2 cum bracteis floreque compositis, ca. 7—10 mm. longis, vagina persistente inferne brunnea polita, superne membranacea grisea; folia supra visa ovata, dimidio inferiore concavo, dorso convexo, carina e linea pellucida composita, 4—5 mm. longa, medio ad 3 mm. lata; pedunculi 2 mm., fructiferi 4—10 mm., longi, basi bracteati, bracteis inferne membranaceis, superne cucullatis viridibusque, 3—4 mm. longis; receptaculum obconicum, 1·5 mm. longum, ad 3 mm. diam.; sepala 5, obtusa, 2—3 mm. longa, basi 1—1·5 mm. lata; petala ca. 3-seriata, e infra medium inferne angustata, obtusa, purpureo rosea, 3—5 mm. longa, ad 1 mm. lata; staminodia staminibus appressa eaque aequantia, massa prope medium constricta; filamenta 4-seriata, conice collecta, ad 2·5 mm. longa, intima prope medium dense papillata, infra papillas pallida, supra purpureo rosea, antheris pollineque niveis; ovarii lobi obtuse compressi, sat distantes, altitudinem disci crenulati attingentes vel parum ultra; stigmata 5, angustissime subulata, saturate purpurea, ad 2 mm. longa; capsulae infra obconicae, 2 mm. longae, supra grosse atre punctatae, ad 1·5 mm. elevatae, suturis valde compressis, ad 5 mm., expansae 7—8 mm., diam., valvis late patentibus, carinis e basi patentibus, apicem valvae fere attingentibus, tuberculo conspicuo, late spathulato, pallido; semina late obovata polita, brunnea.

Cape Province: in dit. Calvinia; Lokenberg, "on rugged sandstone hills, with dry 'fynbos' similar to extreme N. Cederberg. In shallow soil on otherwise bare patches in flattish places", Maio 1964, *E. Esterhuysen* 30700.

Ruschia nordenstamii L. Bol. sp. nov.—Planta basi caespitosa, 3·5 cm. alta sine ramis florentibus, caule 1 cm. longo, 8 mm. diam.; rami primarii 3 mm. diam.; ramuli steriles ultimi 1·5 cm. longi, interdum reliquiis crebis onusti, ortibus hornotinis e 2—4 foliis, internodio incluso, compositis; partes herbaceae, praecipue juveniles, ± velutine pubescentes, pilis minutis; folia in caespite fere erecta, supra visa oblonge ovata, obtusa, lat. visa oblonga, apice oblique rotundo, carinata, carinis marginibusque subpellucidis, lateribus convexulis, subglauce viridia, punctata, punctis saturate viridibus, cum aetate inconspicuis, ad 1·2 cm. longa, medio ad 5 mm. lato diametroque; ortus floriferi 3 visi, erecti elongati graciles, 8—13·5 cm. longi, internodiis primum rubris, demum atratis, 8—20 mm. longis, 1—1·5 mm. diam.; folia minora quam ea in caespite, lat. visa saepius semi-ovata, ad 6 mm. longa; ramuli ultimi floriferi ad 1·5 cm. longi, e 2—4 foliis cum flore solitario compositi, internodio incluso; pedunculi ad 1·3 cm. longi, prope medium bracteati, bracteis lat. visis anguste semi-ovatis, marginibus membranaceis, ad 3 mm. longis; receptaculum subclavatum, ca. 2 mm. longum diametroque; sepala 5, e basi superne angustata, acuta, omnia marginata, 2—3 mm. longa, basi 1—1·5 mm. lata; petala ca. 3-seriata, in fasciculis 5 disposita, inferne vix angustata, exteriora obtusa vel acuta, interiora acuminata, in staminodia transeuntia, purpureo rosea, ad 4 mm. longa, 0·25—0·5 mm. lata, inter angustissima in genere; staminodia ad stamina conice collecta appressa eaque bene excedentia, massa primum supra medium constricta, dimidio inferiore pallide roseo, superiore saturate purpureo roseo; filamenta ca. 3—4-seriata, inferne alba, superne saturate purpurea, intima prope medium papillata, in flore maturo omnia late recurva, antheris pollineque albis; discus profunde acuteque divisus; ovarii lobi obtuse compressis, leviter elevatis; stigmata 5, anguste subulata, caudata alba, 2 mm. longa cum cauda fere 1 mm. longa.

Cape Province: in dit. Vanrhynsdorp; Hol River, prope Vredendal, Aug. 1962, *B. Nordenstam* 799. Fl. N.B.G. Maio 1964.

Schlechteranthus hallii L. Bol. sp. nov.—Planta erecta compacta rigida glabra, "25 cm. alta diametroque" (*H. Hall*); rami primarii ad 1·3 cm. diam., internodiis 7—15 mm. longis; ramuli hornotini 2—4-foliati, internodio incluso; folia ascendentia, supra visa plana vel superne convexula, acuta vel rarius subobtusa, lat. visa matura superne vix angustata, obtusa vel rotundata vel oblique rotundata, polita, pallide subglauce viridia, carinata vel demum carina inferne obscura, saepius 1·5—2·5 cm. longa cum vagina impresse lineata ad 6 mm. longa, deinde ad per 1 cm. decurrente, basi laminae pustulata, 8—10 mm. lata diametroque, lateribus convexulis; flores 2 visi, solitarii, fere sessiles; bracteae receptaculum amplectentes, basim sepalorum attingentes, per 7 mm. decurrentes, lamina ad 8 mm. longa, marginibus membranaceis; receptaculum globose obconicum, 6 mm. longum diametroque; sepala 6, 5—6 mm. longa, basi 2—5 mm. lata, vel in flore altero 4—5 mm. longa, 1·5—4 mm. lata, exteriora acuta, superne carinata, apice interiorum acutissime subulato, membranis brunneis; petala 2—3-seriata, sublaxa, inferne erecta, deinde valde recurva, e parum infra apicem inferne leviter angustata, obtusa, alba vel superne pallidissime roseo suffusa, 7—10 mm. longa, 0·5—1 mm. lata; staminodia inferne ciliate papillata pallidaque, superne roseo purpurea, diu staminibus appressa eaque bene excedentia, massa prope medium leviter constricta; filamenta ca. 4-seriata, parum supra basim vel prope medium papillata, infra papillas alba, supra roseo purpurea, ad 4 mm. longa, antheris pollineque albis; discus inconspicuus, profunde divisus; ovarii lobi erecti approximati convexi, ad per 2·5 mm. elevati; stigmata 12, profunde posita, subulata, breviter caudata, intus conspicue fimbriata, 2 mm. longa; capsula non visa.

Cape Province: Namaqualand; Kuboos, Richtersveld, *H. Hall* 1358. N.B.G. 159/58. Fl. Maio—Jun. 1964.

This plant has been under close observation and the only flowers produced after six years of cultivation are the two described here.

Cephalophyllum kliprandense L. Bol. sp. nov. (*Caespitosa*).—Rami decumbentes vel fere prostrati, ad 9 cm. longi, ad 4 mm. diam., basi per 1·5—2 cm. reliquiis crebris onusta, internodiis inclusis vel ad 1 cm. longis; ramuli floriferi sine floribus 1·5—2 cm. longi, internodiis inclusis vel breviter exsertis; folia ascendentia vel demum patentia, supra visa acuta vel obtusa, plana vel prope apicem convexula, lat. visa superne non, vel vix, angustata, apice obtuso vel rotundato, lateribus convexis, dorso rotundato vel carina in brevioribus acuta, viridia, 1—3·2 cm. longa, cum vagina 3—4 mm. longa, medio 5—6 mm. lato diametroque; flores saepissime 2-nati; pedunculi 1—2 cm. longi; bracteae basales, foliis simillimae, 1—1·5 cm. longae; receptaculum primum breviter obconicum, demum subtruncatum, ad 2 mm. longum, ad 5 mm. diam.; sepala subaequilonga, ad 6 mm. longa, basi 3—4 mm. lata, extima 2 carinata, dimidio superiore incrassato per 2—3 mm. in diametro, apice interiorum acute breviterque subulato; petala 3—4-seriata, infra medium inferne angustata, saepius subtruncata leviterque emarginata, aurea, 1—2 cm. longa, 1·5—2 mm. lata; filamenta 4—5-seriata, lutea, in genere inter brevissima, ad 3 mm. longa, antheris pollineque albidis; discus inconspicuus; ovarium per 1 mm. elevatum, lobis obtuse compressis, minute nitenteque tuberculatis; stigmata 10, subulata pallida, in genere inter brevissima, 1·5 mm. longa.

Cape Province: in dit. Vanrhynsdorp; Kliprand Farm, *F. J. Stayner*. Karoo Garden 1223/62. Fl. Jul. 1964.

Sphalmanthus herrei L. Bol. sp. nov. (*Eusphalmanthi*).—"Radix carnosa, sat crassa" (fide H. Herre); rami plures visi, culti per 8 menses, glabri, ad 50 cm.

longi, basi ad 6 mm. diam., internodiis 2·5—5 cm. longis; partes herbaceae saturate virides, inconspicue papillosae, papillis linearibus vel ovalibus, vix elevatis, praeter eas in receptaculo leviter elongatas, cum aetate delapsas albasque itaque receptaculum subfurfurosum; folia infra inflorescentiam opposita, deinde alterna, supra plana vel leviter concava, obtusa, dorso rotundo, lat. visa superne vix angustata, apice rotundo, 4—7·5 cm. longa, ad 5 mm. lata, ad 6 mm. diam.; flores solitarii diurni; pedunculi in receptaculum gradatim transeuntes, teretes, 3—5 cm., fructiferi feri ad 1·5 cm., longi; receptaculum subclavatum, ca. 5 mm. longum, 7 mm. diam.; calycis tubus 3—4 mm. longus, segmentis 5, extimis 2 supra fere planis, 2·3—3·3 cm. longis, interioribus infra planis marginatis, superne teretibus, ad 1·4 cm. longis; corolla pallidissime viridis, tubo 2 mm. longo, segmentis ca. 6-seriatis, obtusis, saepius ad 1·4 cm. longis, 0·25—0·75 mm. latis, inter angustissima in genere; staminodia nulla; filamenta ca. 8-seriata, pallida, ad 9 mm. longa, antheris pollineque luteis; fossae profundae; ovarium supra demum ad 1·25 mm. elevatum, lobis politis, superne leviter compressis; stigmata 5, sat gracilia, superne angustata, ad 3 mm. longa; capsula fera rigida, infra clavata, 5-costata furfuracea, pallide brunnea, supra per 5 mm. elevata, suturis acute compressis, leviter ringentibus, 1·3 cm., expansa 2·3 cm., diam., valvis late patentibus, carinis ad 2·5 mm. altis, alis erectis, 2 mm. latis; semina atre brunnea.

Cape Province: Namaqualand; Aughgrabies, Oct. 1963, *H. Herre*. S.U.G. 14856. Fl. Maio—Jun. 1964.

CORRECTION

Delosperma gracillimum L. Bol. nom nov.—*Delosperma gracile* L. Bol. *Journ. S. Afr. Bot. 27:* 180 (1961)—homonym.

NOTE.—The type specimens of all new species described in this paper are in the Bolus Herbarium, University of Cape Town, Rondebosch.

(*To be continued*)

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